Service Manual for Wuling Electric Pickup Truck

Preface

Wuling electric pickup truck is researched and developed by Technical Center of Liuzhou Wuling Automobile Industry Co., Ltd. and manufactured by Liuzhou Wuling Special-purpose Vehicle Manufacturing Co., Ltd.. This product is used for freight in factories, residential areas, gardens, farms and other areas. This economical, environment-friendly and practical product is your good assistant in your work and life.

The preparation of this Manual provides references for correct repair and maintenance of Wuling electric pickup truck by maintenance man.

This Manual is precise in layout and convenient in lookup. The content in this Manual is consistent with the latest product structure and technical state when this Manual is published. The technology of our product is improved continuously, so the structure of the product manufactured later may change. Please pay more attention to these differences when maintenance. If you have any questions, please show solicitude for the updated edition of this Manual, or directly consult to Technical Center of our Company.

This Manual also can be used as the references for engineering technicians.

Because the time for preparation of this Manual is so short, please understand and correct if any insufficiency and error, and welcome to make your valuable comments and suggestions.

Liuzhou Wuling Automobile Industry Co., Ltd.

January 2009

How to Read and Use This Manual

1) This Manual's catalogue consists of general catalogue and chapter catalogue. The chapter catalogue is listed in the first page of various chapters. And the chapter name and chapter page are marked in the header for each page.

2) Please read basic information of Chapter 1 firstly when reading and using this Manual.

3) For avoidance of improper operation, "**Warning**" is used for special prompt of danger to vehicles and personal safety, and "**Attention**" for prompt of light hazard and harm.

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Chapter 1 Basic Information

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Chapter 1 Basic Information

1.1 General Information

1.1.1 Diagnosis Form

Diagnosis form records the vehicle trouble; users shall properly fill in this Form, which is the original record for the Service Station to analyze the vehicle's failures before maintenance and write in Maintenance Record.

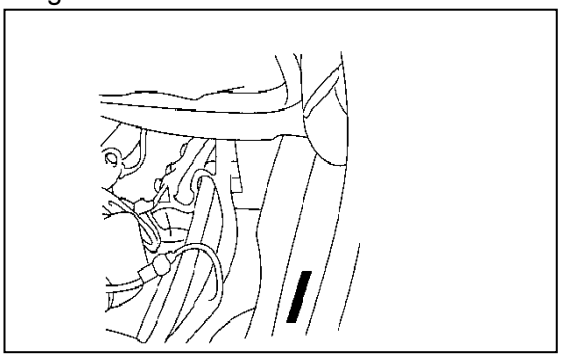
Checklist for Trouble (Sample)

<table>
<tr><td colspan="2">User Name：</td><td>Vehicle Model：</td><td colspan="2">VIN：</td></tr>
<tr><td colspan="2">Purchase Date：</td><td></td><td>Date in Trouble：</td><td>Mileage：</td></tr>
<tr><td colspan="5">Trouble</td></tr>
<tr><td colspan="5">□Abnormal noises of drive shaft □Abnormal noises of rear axle □Others</td></tr>
<tr><td colspan="5">□Steering loose □Front wheel vibrating □Tire uneven abrasion □Driving deflection
□Brake delay □Brake deflection □Brake pedal loose □Brake fluid leaking
□Others</td></tr>
<tr><td colspan="5">□Battery charging in failure □Abnormal light □Abnormal horn
□Radio and cassette player not working □Instruments working abnormally □Others</td></tr>
<tr><td colspan="5">□Power battery fault □poles of battery ablated □transmogrification of power battery
□Power battery charging in failure □Electromotor and Electromotor controller failure
□Record the information of the failure □Others</td></tr>
<tr><td colspan="5">□Door lock fault □Seats bad □Window regulator fault □Others</td></tr>
<tr><td colspan="5">The vehicle conditions/ environmental aspects when problems arise</td></tr>
<tr><td colspan="5">Vehicle/Environmental Conditions in Trouble</td></tr>
<tr><td colspan="5">Environmental Conditions</td></tr>
<tr><td>Weather
Temperature
Frequency
Road conditions</td><td colspan="4">□Sunny □Cloudy □Rainy □Snowy □Any weather □Others
□Hot □Warm □Cool □Cold （ °F/ °C）
□Any condition
□At any time □Sometimes (times/day, month) □Just 1 time □In special conditions
□City area □Out of city □Expressway □Mountain areas (□upslope □ Down slope)
□Bituminous macadam □Macadam □Others</td></tr>
<tr><td colspan="5">Vehicle conditions</td></tr>
<tr><td>Vehicle conditions</td><td colspan="4">□Running moment □Constant speed □When accelerating □Decelerating moment
□Turning right moment □Turning left moment □Parking moment
□Driving speed (km/h, miles/h) when trouble arises □Others</td></tr>
<tr><td colspan="2">Troubleshooting code</td><td colspan="3">First check: □No code □Normal code □Fault code
Second check: □No code □Normal code □Fault code</td></tr>
</table>

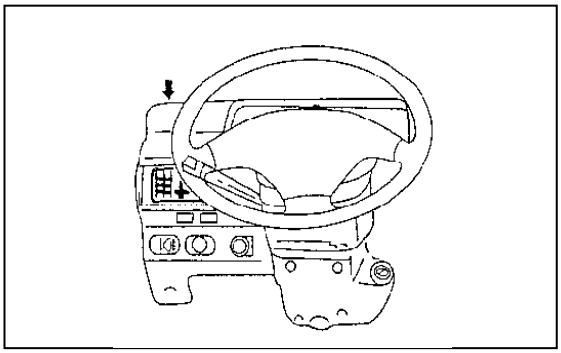
Note: The above form is for reference only, which may be revised according to the special conditions in different areas if necessary。

1.1.2 Vehicle Identification Number (VIN)

VIN is stamped on the frame under the right seat of driving cab。

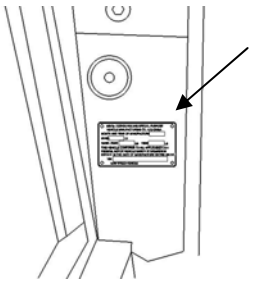


One vehicle identification plate is riveted on the surface of dashboard on the left. VIN is indicated on it.



1.1.3 Nameplate

Nameplate is riveted on the center-pillar on the left of driving cab。The information contained in the nameplate varies with different vehicle type.



1.2 Brake Fluid, Lubricating Oil and Fluid Sealant

Items	Recommended specifications		Volume(L)
Gearbox Lubricating Oil	GL-4	90 （General area） 75W90（Northeast or northwest China）	1.0
Rear axle Lubricating Oil	GL-5	80W90（ Northeast or northwest China ） 85W90（ North China ）	1.2
Brake fluid	TEEC HZY3 automobile brake fluid HZY3 degree or DOT 3 degree above		0.5
Brake Cylinder grease	Chongqing Yiping 7503		
Chassis grease	Chongqing Yiping7022,#2 viscosity: Q/SHYPO2·017Z-2000		
Servicing materials	1.Anaerobic adhesive GY340; 2.Baideadhesive; 3.Glue1201; 4.HZ-1RTv sealant, oil and grease resistant; 5.1406 screw fastening adhesive.		

Attention: Do not mix two kinds of brake fluid.

1.3 Tire pressure

Tire pressure (cold conditions)

PSI（kPa）

Item	pressure
Front	29（200）
Rear	29（200）

Attention:

After the tire being inflated, take the four holes of assembly bolt as location centre to test the balance on a dynamic balancer. The unbalance degree should not exceed 10g. Otherwise, always attach adequate counterbalance onto the two sides of wheel rims.

1.4 Notices to Vehicle maintenance and Repair

1.4.1 Notices before Inspection and Repair

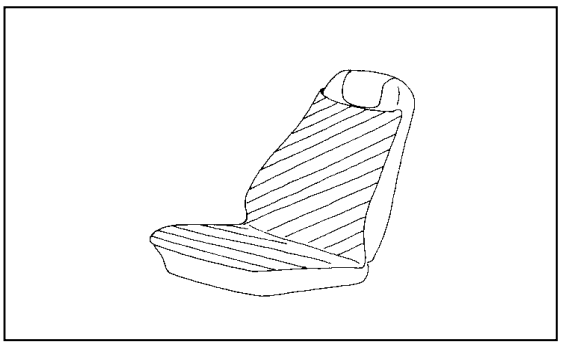
◆Security

Before maintaining the high-tension parts of the motor, motor controller, power battery and DC/DC conversion, the cable of the power battery must be disconnected.

Before checking and repairing the high-tension circuit, the cable of the power battery must be disconnected.

◆Protecting Components Concerned

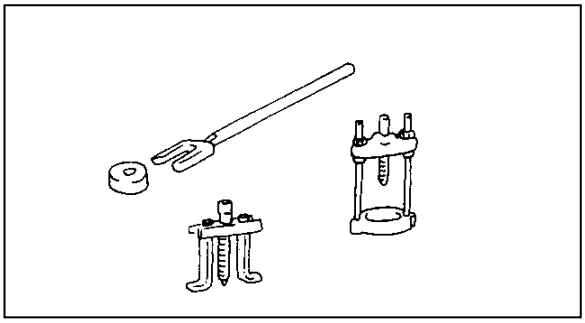
Since some parts may be damaged or stained during the check and repair, always take relevant measures for protection.



◆Properly arrange the parts as per the disassembly sequence.

◆Reasonably identify the parts to be replaced and to be reused.

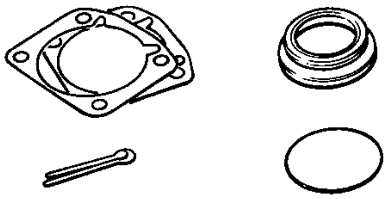
◆Always use special tools as much as possible to protect parts from damaging.



◆ The parts below have to be replaced with new ones after they are removed.

- Oil seal
- Liner
- Sealing gasket
- O-ring
- Locking washer
- Split pin
- Lock nut
- Guard belt and retaining ring

Have to replace with new parts

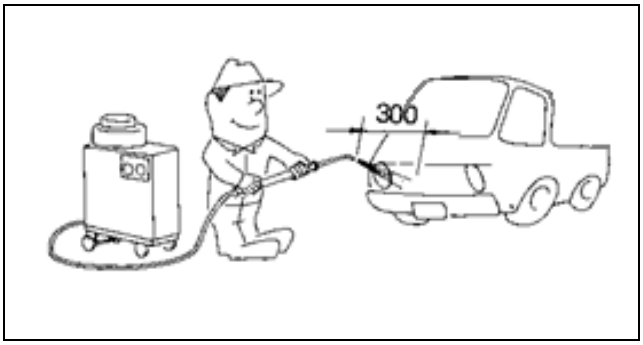


◆You should only use the genuine Wu Ling parts to replace them.

Vehicle Washing

When using a high pressure washing gun to wash your vehicle, always maintain the nozzle 300 mm away from each plastic part or each opening (such as doors, truck and roof opening).

No washing the automobile chassis of electromotor controller system and power battery directly。

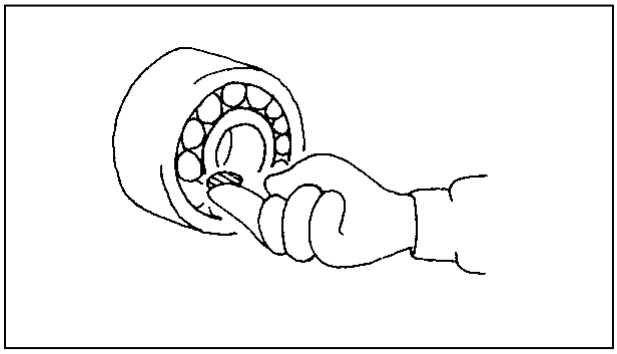


◆Hose and Other Rubber Parts

●To avoid damaging to rubber parts, be sure not to stain them by oiled fluids such as machine oil,etc..
●when assembling of hoses and hose clamp, keep it parts form any other parts, to avoid them shaking and abrasing.

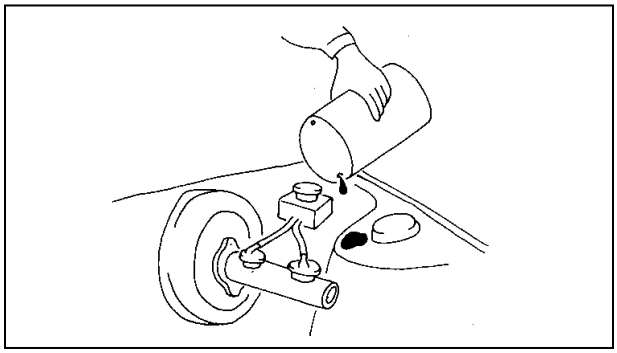
●Lubricating Oil

It is highly recommended to only use the specified lubricant during the assembly according to the methods mentioned in this manual。



◆**Brake Fluid**

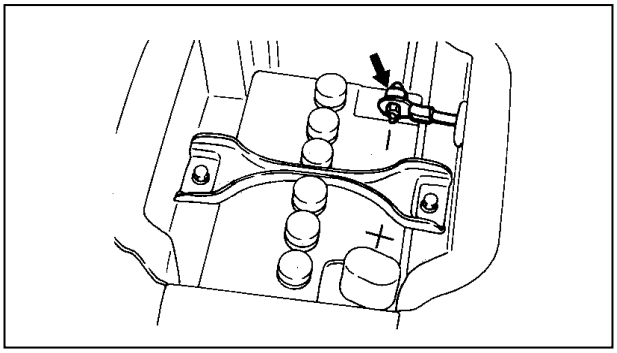
Never spill off the brake fluid, or it will damage the finish coating of your vehicle. If there is any spill, you should wash the stained part immediately by using clean water.



1.4.2 Notices to Electrical Service

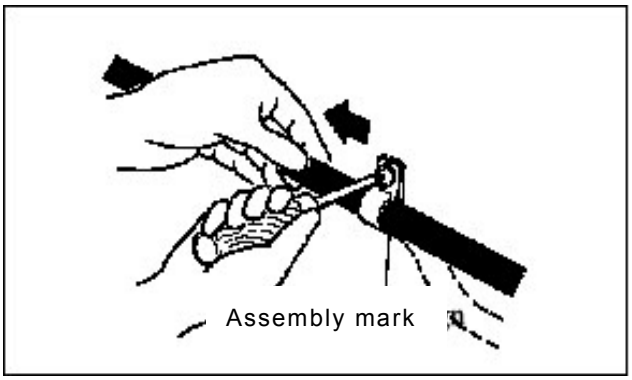
◆You should disconnect the negative terminal from the power battery before checking the circuit。

Attention: Be sure to disconnect the ignition switch and light switch before connecting or removing the negative cable (Or damages may be resulted in.).

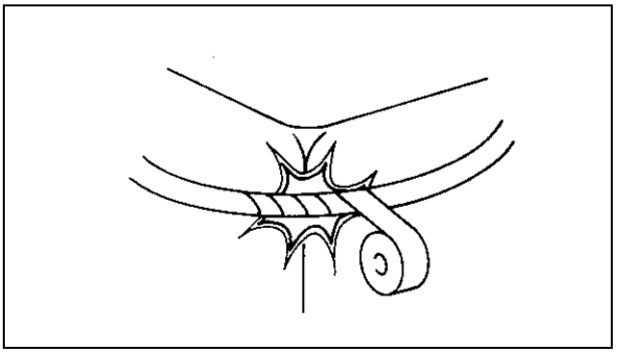


◆ Use a cable clamp to tighten the wiring harness to avoid any looseness. The wiring harness connected to vibrating parts such as the electromotor, etc. should be loose in a certain scale so that the free oscillations of the vibrating parts will not be restrained by the harness connection. When using cable clamps to fix them, you should confirm that its relaxation modulus is adequate.

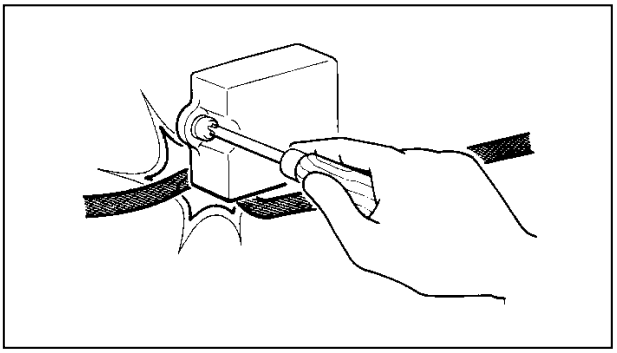
◆If there is a assembly mark indicated on the harness (color strip), on which you should fix the harness properly。



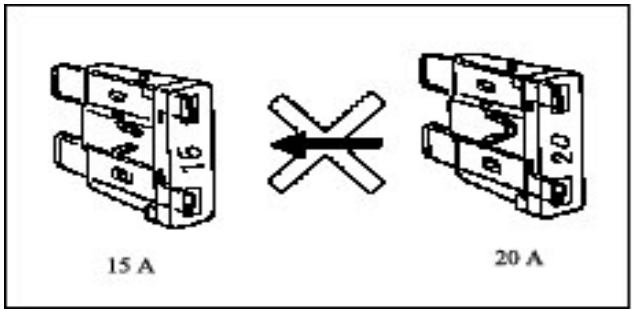
◆ If a harness has to contact with any sharp edge of the other parts, be sure to protect the harness by using ethylene tape, etc. to twine the parts that the hardness is easy to touch with the sharp edge, to avoid any possible damage to electrical wire.



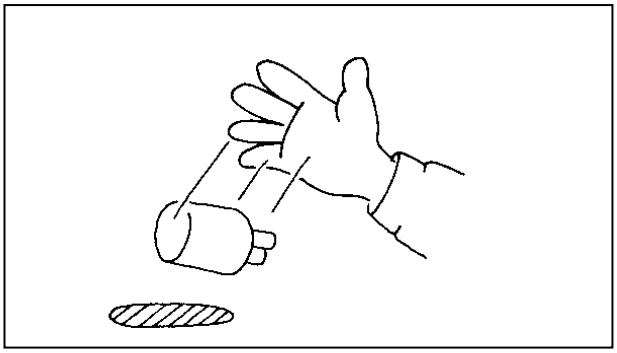
◆Never allow any wiring or harness be pressed under any parts.



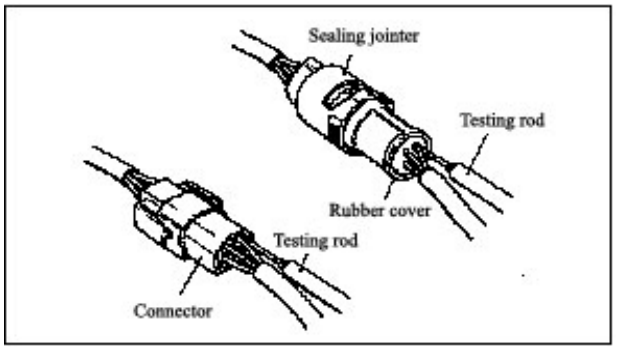
◆Only use the fuse with the specified current capacity to replace the fuse blown. If using the fuse with bigger current capacity, some parts may be blown even accidents such as fire, etc. may be resulted in.



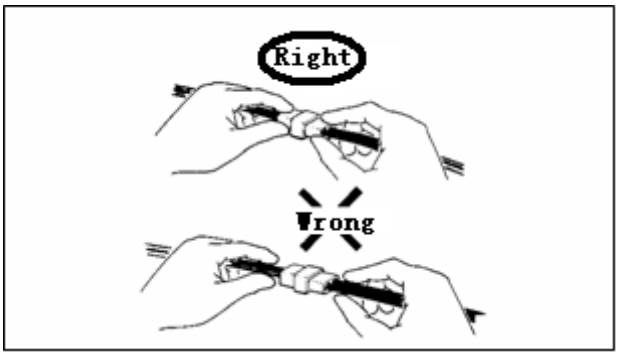
◆ Take especially careful about the sensor，relay and other electronic parts， they are extremely vulnerable; do not drop them off.



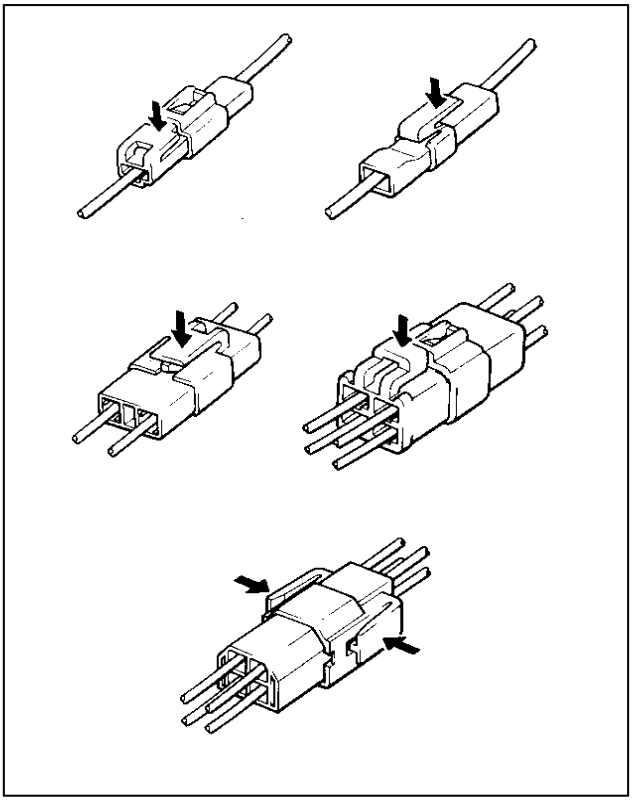
◆ When using a multi-meter to check the circuit conductivity or the circuit voltage at the connection of connector，only insert the probe into the side of the harness。If you need to check a sealed connector， insert the probe into the hole on the rubber protecting cover until the connector inside is touched. Be sure not to damage the insulation part of wire.



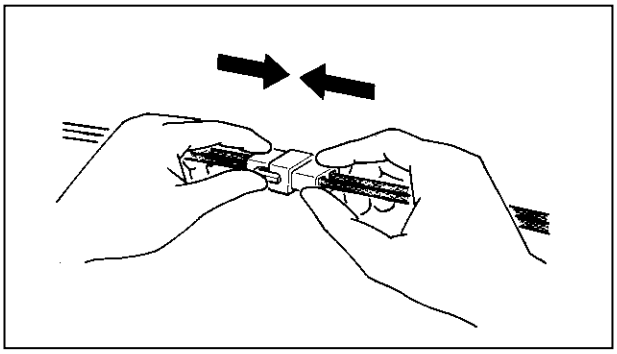
◆Disconnect an adapter by pulling both ends of the adapter。 Do not disconnect an adapter by pulling the cable connected.



◆Always press the locking device as per the arrowhead direction shown below to disconnect an adapter attached with locking device.



◆When you connect the adapter attached with a locking device, plug in the connection until a click is heard.



1.4.3 Intermittent Defect

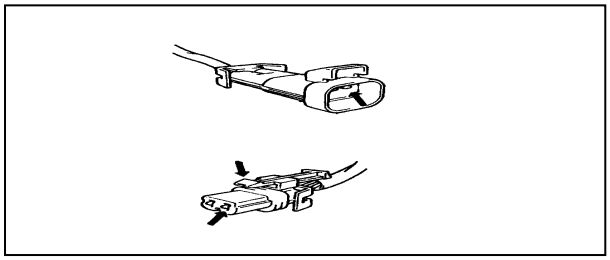
The intermittent defect is mostly resulted from the failures of wire connections or wires themselves, sometimes it caused by the faults of the stick relay or the magnetic coil. Always check the circuit thoroughly if your suspect there is any fault with the circuit.

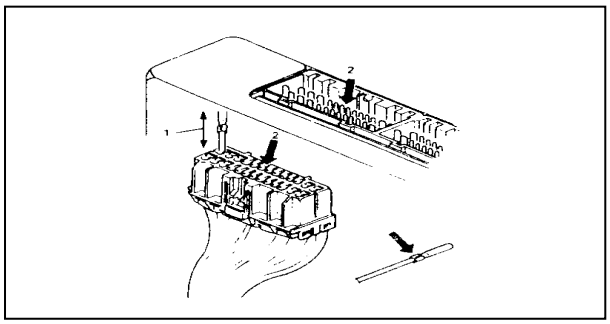
◆ Check the mating connectors.

●The stained contact pin and socket may influence the connection。

●Contact pin or socket is in poor shape or is damaged。

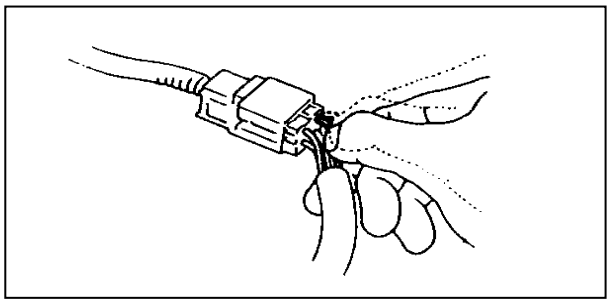
●The adapter is damaged or has a poor contact due to the effect of water, oil, grease or any other dirties.





◆ Check the contact between connection-pegs (or connector) and **wires.**

Check every connector of faulty circuits for poor contact by shaking wires slightly. If any abnormity, repair or replace them if necessary 。

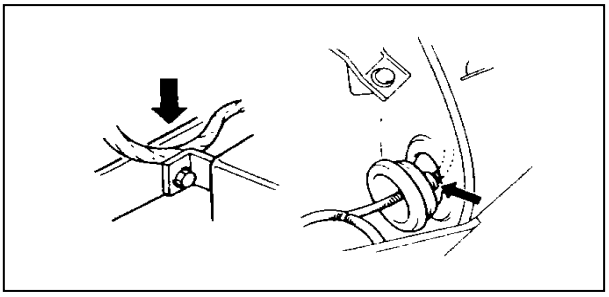


◆ Check the wires.

● Check if the wires are completely insulated. If any naked section of a wire contacts with the vehicle body or any other conductors, it will lead to short circuit。

●Ensure all wires are in good conditions and may function properly。

●If a wire consists of several cords，check its resistance.If abnormal，repair or replacement is necessary.



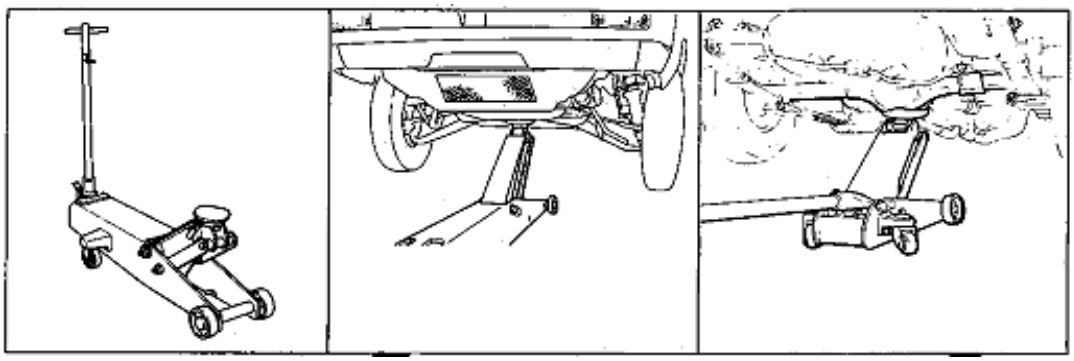
1.4.4 Preparations before the Disassembly

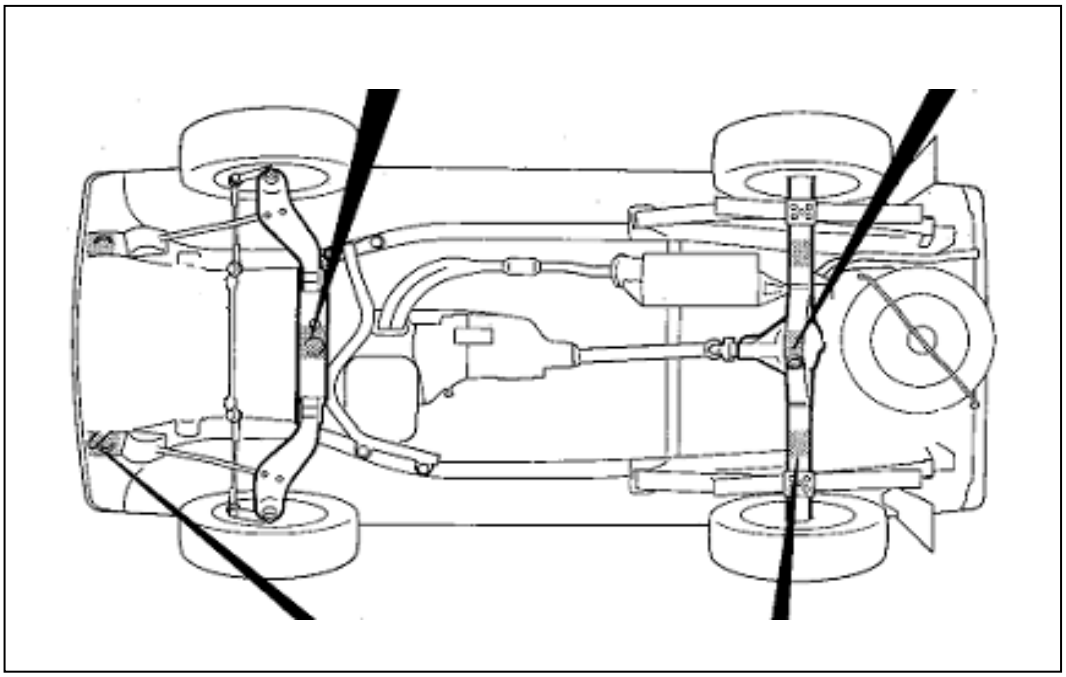
1.4.4.1 Lifting the vehicles

◆Lift (or jack up) your vehicle to a certain height and the hoisting (or supporting) point should be reliable with reasonable weight distribution. The hoisting (supporting) height of vehicle should be suitable and convenient for disassembly and assembly.

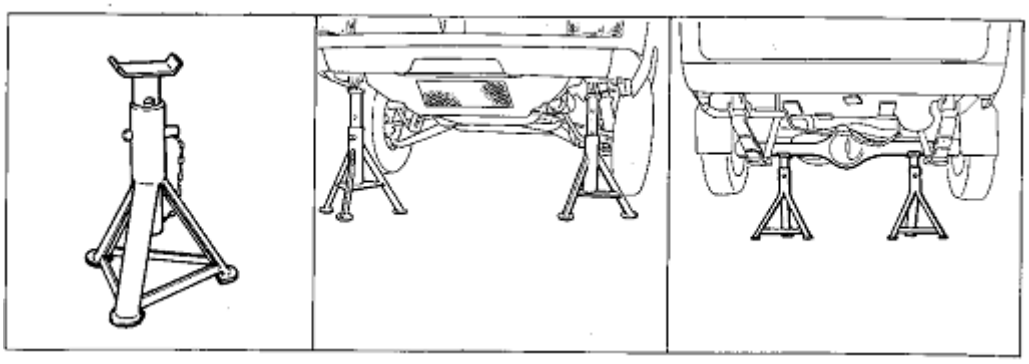
◆When lifting up your vehicle with a jack (or a lifting jack), you are advised to lift the vehicle according to the specified position, to avoid any possible damage to the vehicle body.

● Using a jack：

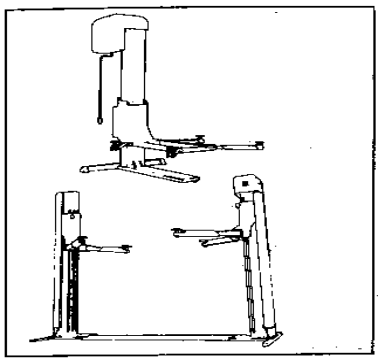


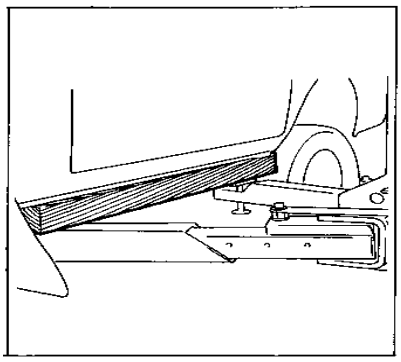


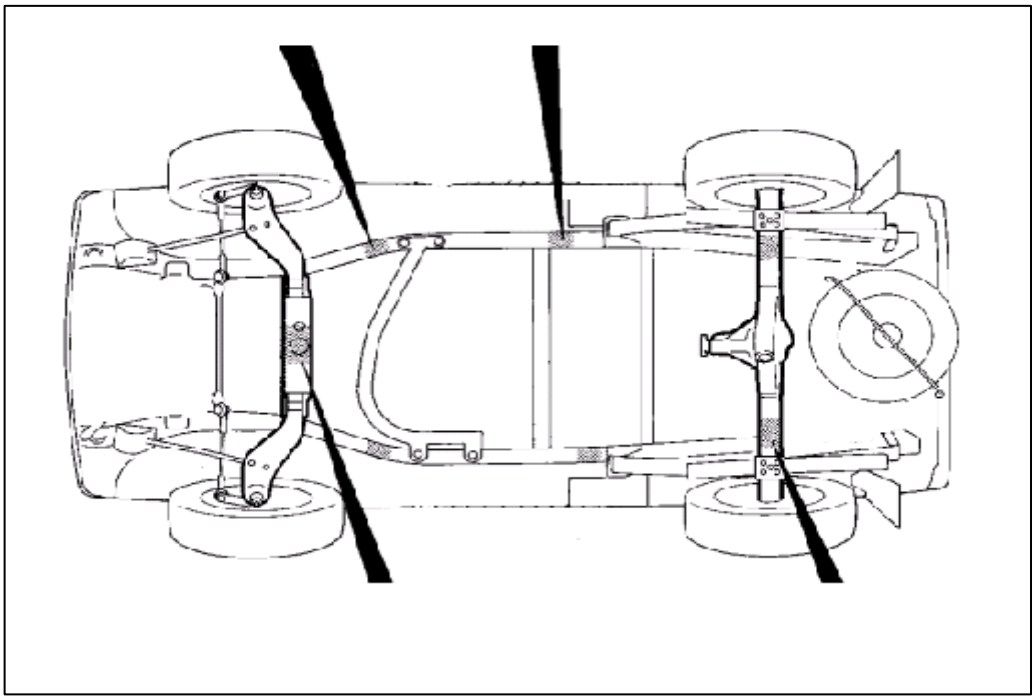
● Using a bracket：

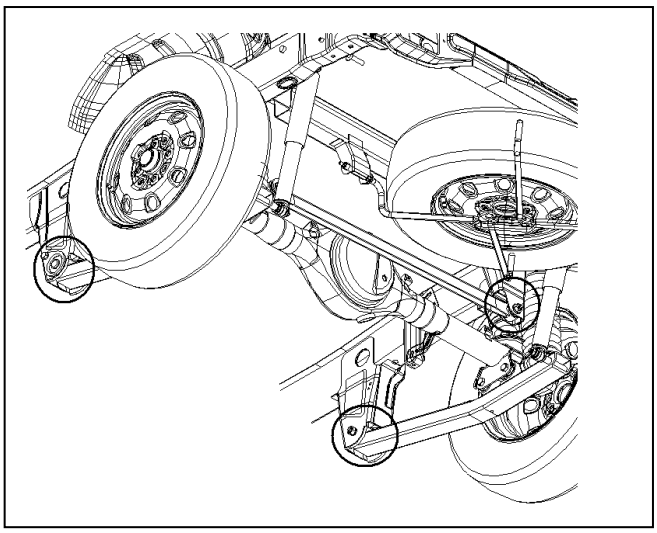


● Using a two-sided stretch type autolift:









1.4.4.2 Rear Axle Disassembly

- Jack up the vehicle saftely and reliably, remove the wheels.
- Use a suitable support to jack the rear axle up.
- Remove the parking brake cable, drain the brake fluid and take off the brake hose. Loosen the U bolt and disassemble the leaf springs on the two sides at the same time.
- Remove the lower connector of the rear shock absorber.
- Lower the support to separate the rear axle from the vehicle body。
- When singly disassembling some elements from the rear axle or other assemblies, you can lift (or jack) the vehicle (or a part of the vehicle)as necessary.

1.4.4.3 Electromotor Disassembly

- Disconnect power battery Connecting cable.
- Disconnect connect the connector plug of wiring harness.
- Remove the flange bolt connecting the rear axle and the drive shaft，and then draw out the drive shaft。(Use a clean stopper to block the output end of gearbox，preventing the lubricating oil from flowing off.)
- Pad the bracket under the electromotor, and support the electromotor.
- Remove the hoisting bolt of gearbox (at the point where the gearbox is connected with frame).
- Remove the bolts connecting the electromotor suspension and the R&L beam，then lower the bracket to remove the electromotor from the vehicle.
- When standing in a trench to install the electromotor，make sure to hold the electromotor firmly to avoid any possible injuries.

1.4.4.4 Assemble

Lift or jack up the vehicle to a certain height. Please refer to the information concerning the disassembly for reassembly.

Attention:

- During the reassembling, the unchanged parts should be all cleaned, especially the mating member. Apply corresponding lubricant on the surface that needs lubricating..
- During the reassembling, tighten all fasteners to the torque specified. The torque value is indicated on the assembly drawing。

1.5 Table of Performance, Structure and Specifications for Entire Vehicle

1.5.1 Table of Dimension and Mass parameters：

Items			WLD1200Q1P
Type			Flat head 4×2 driving with rear wheels
seating（including the driver's）			2 seats
Dimension parameters (mm)	Overall size	Length	4115
		Width	1560
		Height	1840
	Wheelbase		2080
	Wheel track	Front wheel	1350
		Rear Wheel	1335
	Inner dimension of packing box	Length	2470
		Width	1490
		Height	300
	The distance between the packing box floor and the ground		746
Type of carriage			Carriage with 3 doors
Mass parameters lb（kg）	Complete vehicle kerb mass		2368(1074)
	Kerb axle mass	Front	1083(491)
		Rear	1285(583)
	Full load mass		2998(1360)
	Full load axle mass	Front	1475 (669)
		Rear	1523 (691)
	Carrying capacity		2 persons（68kg/ person），and 150kg loading

1.5.2 Table of performance parameters：

Items			WLD1200Q1P
Trafficability parameters	Minimum turn radius (m)		4.75
	Minimum Ground clearance （mm）		160
	Approach angle°		30
	Departure angle°		25
	Front overhang (mm)		780
	Rear overhang (mm)		710
Steering parameter	Camber angle°		1°±30′
	Kingpin inclination°		14°20′±1°
	Kingpin caster°		2°42′±1°
	Toe-in(mm)		0～3mm
	Maximum turning angle of front wheel	Inside wheel°	34
		Outside wheel°	31
Main parameters	Maximum speed (Km/h)		40
	Maximum climbing capability°		8
	Driving Distance(Km)		50
	Max. slope-parking capacity°（No-load）		20

1.5.3 Table of Structure and Specifications：

Items			WLD1200Q1P
Drive shaft			Open, single-root, two universal joints
Rear axle	type		Stamping, welding, Integral shell ,Semi-floating axle shaft
Suspension	Front suspension		MacPherson strut type, telescopic shock absorber, independent suspension
	Rear suspension		Longitudinally mounted symmetry type semiellipse leaf spring with telescopic shock absorber
Steering	type		Rack and pinion type
Braking	Service brake		Dual-circuit hydraulic braking system, front disc and rear drum brakes
	Parking brake		Mechanical cable type for rear wheel
Wheel	Type of tires		Meridian tire
	Tire specification		175 R13 LT
	wheel rim		13×5J（or 13×5.00B）
body			Two doors with full metal
frame			Carriage type frame, carriage and frame are connected with bolts
Low pressure electrical equipment	The connection type of wire		Cathode ground strap connection
	Rated voltage of circuit		12V
	Storage battery		12V/36 Ah
	Tucket		≥93dB (the position of 2m distance)
	Washer		Intermittent washing and wiping with motor
	Wiper		Motor auto-return, intermittent and two-speed (no-load 45times/min,70time/min)
	Lighting system	Head lamp	60w/55w
		Front position lamp	5w
		turn signal lamp	21w for front left, front right, rear left and rear left , 5w for side
		brake lamp/rear position lamp	21w/5w
		backup lamp	21w
		license plate lamp	10w
		interior lamp	5w
		instrument panel lamp, indicator light	3.4w
	Turn signal lamp flashing frequency		85±12times/min
	Alarming signal lamp flashing frequency		

Items		WLD1200Q1P
Electromotor	Rated voltage (v)	72
	Rated power (kw)	6
Electromotor controller	Rated voltage (v)	72
	Rated electric current (A)	85
Auxiliary storage battery		12 V 36 Ah(C_{20})， cathode ground strap connection
Power storage battery		72V 115 Ah(C_5)
DC/DC Converter	Input voltage (v)	72
	Output voltage (v)	13.5
	Max output electric current(A)	25
Charger（AC/DC）	Input voltage (v)	90-260（AC）
	Max input electric current (A)	12
	Max charging time (h)	12
Safety control system	The rated electric current of fuse cutout(A)	300
	The rated electric current of contactor(A)	100

1.6 Regular Check, Service and Maintenance

Regular check, service and maintenances refer to the check, service and maintenances you should perform at a regular interval of time or driving mileage. To maintain a proper functioning of your vehicle and to ensure the passengers' safety and comfort, it is highly recommended that you should perform the regular maintenance as per the following schedule.

1.6.1 Regular Check, Service and Maintenances

Please refer to the Form below:

※Under hostile conditions, such as in the dusty area, replace all parts at a shorter interval or clean all parts more frequent.

Items \ Interval(months) / Interval (km)		Break-in	3	6	12	18	24
		2000	5000	10000	20000	30000	40000
Power Train	Gearbox lubricating oil	G		J.B			G
	Propeller shaft: check			J			J．G
	Speed reducer lubricating oil	G		J．B			G
	Connecting bolt: fasten as necessary	N	N				
Wheel	Wheel nut: tightness (As per the specified torque)	J．N	N				
	Check on Front wheel hub bearing pre-tightening: lubricate	J．T			J．T		Q．T
	Toe-in adjustment	J．T	J．T				
	Tire transposition			T			
Steering	Rubber cushion for the connections of steering axle and steering gear, ball joint of tie rod and link rod, the wear or rubber aging of steering swing arm, engaging clearance of steering rack and pinion: Check, adjust and replace				J．T．G		
	Connecting bolt: fastening	N	N				
Braking	Check the braking line; Check, adjust and lubricate the parking brake and brake pedal ; check and adjust the free travel of brake pedal.	J．T	J．T．R				
	Check the brake fluid: replenish or change if necessary	J．B	J．B				G
	Mater cylinder and wheel cylinder rubber cup: replace						G
	Check the friction plate for the disc or drum brake					J．T．G	
	Connecting bolt: fastening	N	N				

Suspension	Check the performance of front and rear shock absorber				J		
	Check lower arm bush and ball pin; check strut bar bushing; check the leaf spring hanger inner board, U bolts and rubber lining; check the rubber cushion assembly; check the wear of rubber cushion, flat bearing and dust guard,etc.on the front suspension; check the breakage and aging of rubber elements.			J	J. G		
	Check and lubricate the leaf springs; check the coil spring.			J. R			
	Connecting bolt: fastening	N	N				
Frame	Frame and cab: calibrate and weld					J. T. H	
Electrical	Check and charge battery: grease the pillar as necessary Check the venthole.			J			
	Check the cable connectors.				J		
	Check the lighting equipment: check all signal lamps; check the indicator, instrument cluster and switch		J. G				

Note: “J”= Check; “J. T ”= Check or adjust, replace if necessary; “J.B”= Check and replenish liquid level; “N”=Tighten specified torque; “R”= Lubricate; “G”= Replace; “Q”= Clean; “H”= Weld.

Service the power battery , motor controller , DC/DC Converter and charger according in chapter 10 。

Chapter 2 Steering System

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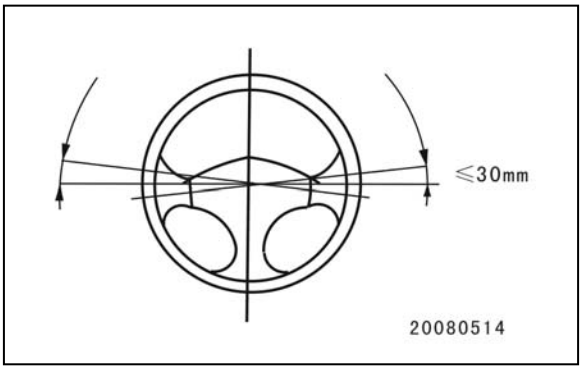
Attention: All fasteners of steering system may influence key function of important fastener. If any parts must be replaced, be sure to use the same parts with same part number. If reassembling, always tighten all the parts as per the specified torque to ensure they are re-fixed well.

2.1 Check and Adjustment of Steering System

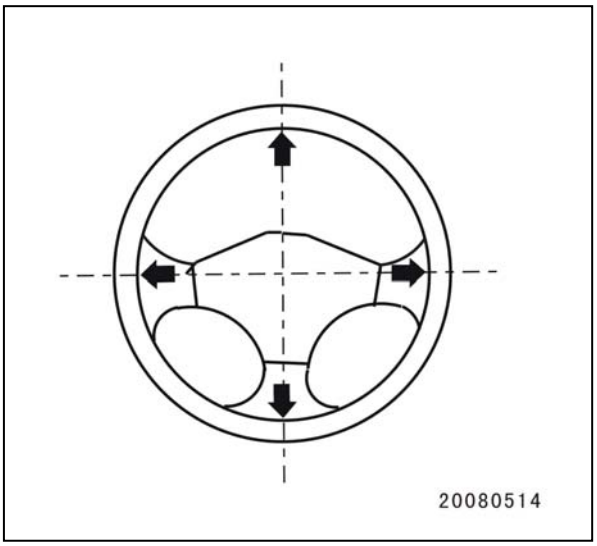
2.1.1 Check on the free stroke of steering wheel

Leave the steering wheel in straight driving position, and turn it left and right. The arc distance of the outer diameter swing is defined as free stroke, which is limited by 30mm. If the actual distance exceeds the limit, please check the connection of the steering tie rod ball stud, the backlash of steering pinion racks, and the universal joint clearance of the cross axle of steering shaft. Sectional inspection could be used. Normally, the clearance of the joints should be zero or slight, whose total clearance reflects as the free stroke of steering wheel. Overlong of free stroke may cause slowness of the manipulation or swing of the front wheel



2.1.2 Check on the steering column axial clearance

There should be no clearance when pushing or pulling the steering wheel upward and downward. If any, it may be caused by worn-out rubber mat in steering column tube or shearing defect of plastic shear lock pin which is used for keeping the length of steering column. In this case, the damaged component or steering column assembly must be replaced.



2.1.3 Check on the rubber pieces/joint

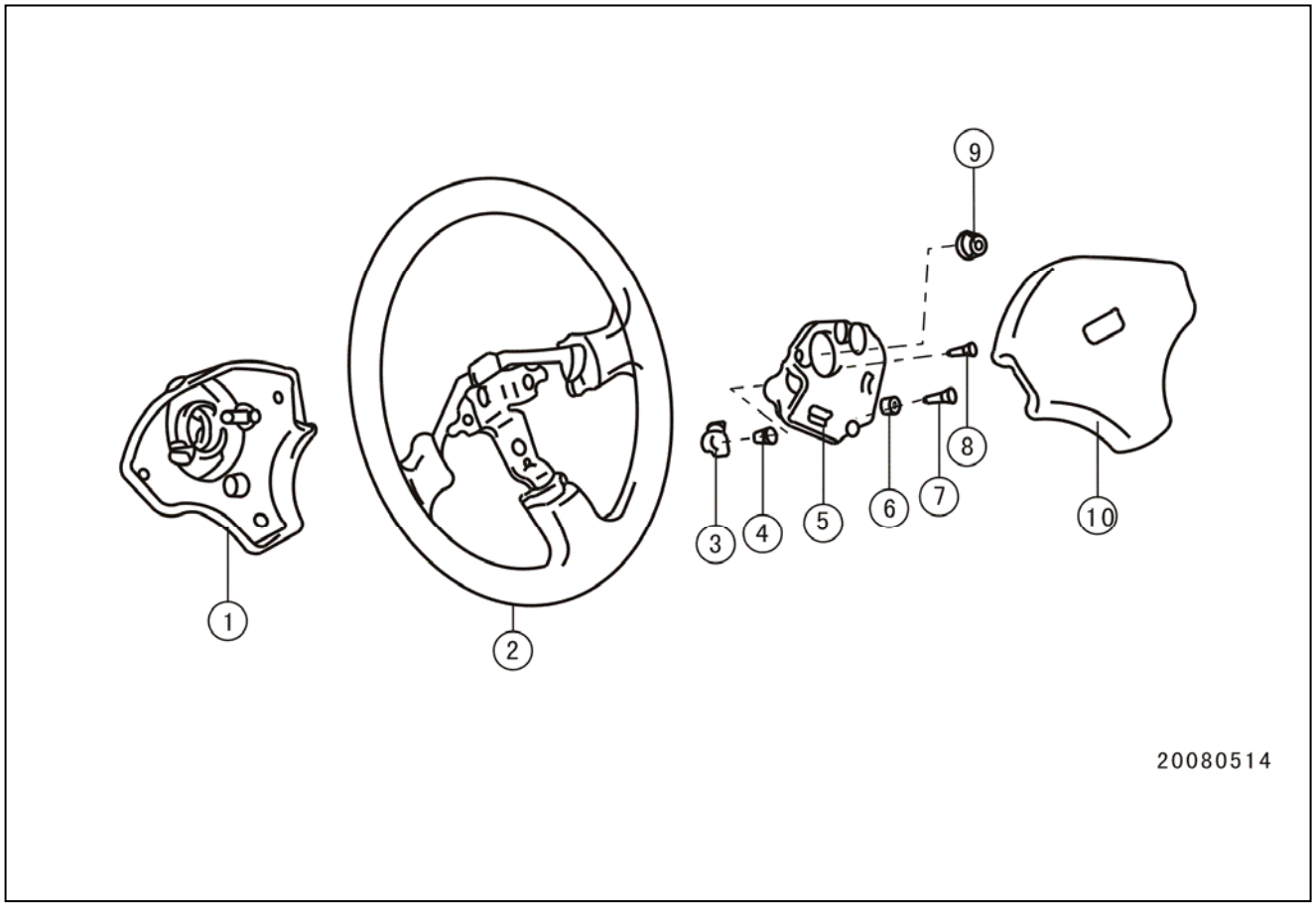
Jack up the vehicle to check whether the dust guard of pinion rack is damaged. If so, dust and water may immerge into steering gear and tie rod ball stud through worn-out dust guard and cause abrasion, rust and noise of steering rack & pinion and tie rod ball stud assembly, so steering system malfunction is resulted in, and replacement is necessary.

Check if the dust guard of steering tie rod plinth is damaged, and replace it with a new one even if a slight breakage was found on it in use.

Check if there is breakage on lower steering column joint, lower steering drive shaft joint and steering shaft such as cracks, fractures, out of control or excessive clearance, etc..

2.2 Steering Wheel

2.2.1 Part Drawing of Steering Wheel



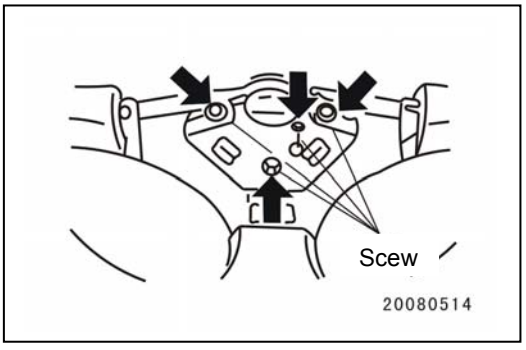
1. Steering wheel lower cover
2. Steering wheel body
3. Horn button
4. Horn Button Spring
5. Horn Button Touch Pad
6. washer
7. Screw
8. Screw
9. Lock nut
10. Steering wheel upper cover

2.2.2 Disassembling and Assembling

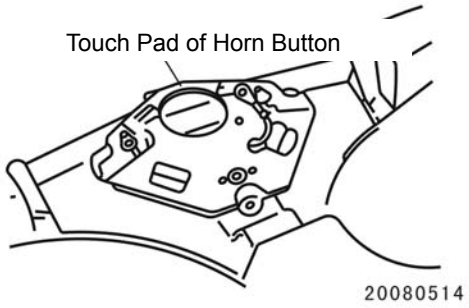
While disassembling steering wheel, lock the steering column in “straight and forward position” to avoid damage to contacted attachments and steering wheel while reassembling。

Before disassembling, disconnect the cathode circuit of battery.

1. Pull upward the upper cover along the front edge of steering wheel to remove it.



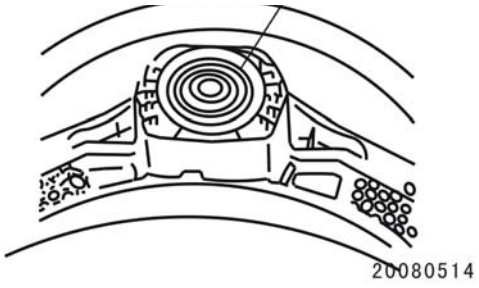
2. Screw off the four screws.



3. Take off the touch pad assembly of horn button.

4. Remove the horn button insulation spacer and contact spring from the horn button touch pad.

Apply conductive grease lubricant onto the contact ring surface between the lower cover and the contact of horn.



5. Remove the lower cover subassembly

6. Assemble sequence is opposite to that of disassembling.

2.2.3 Installation of steering wheel assembly

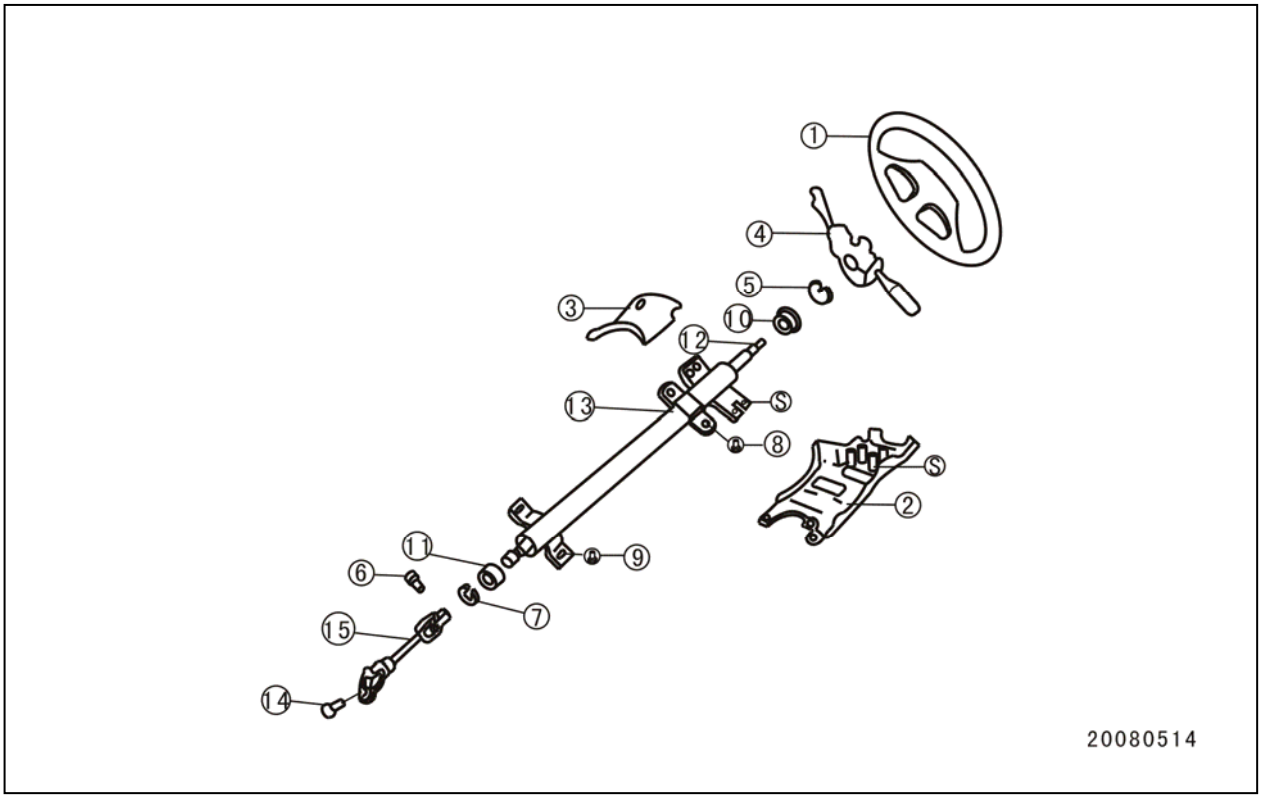
1. Apply conductive grease lubricant onto the contact ring surface between steering wheel assembly and combination switch.

2. The concave hole on the bottom of steering wheel should match with the dummy club of steering switch when installing the steering wheel. The tightening torque of clamp nut shall be 29~39 N·m

Attention
Before mounting steering wheel onto steering upright column, keep the vehicle on "driving straight" position.

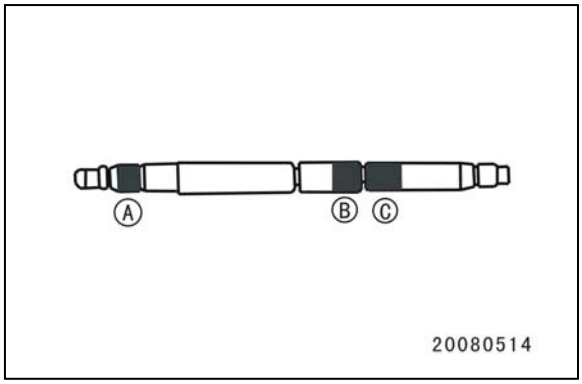
3. Install horn button and steering wheel upper cover

2.2.4 Drawing of Site of Steering Column Components



1. Steering wheel 2. Lower cover of combination instrument panel decorative sheet 3. Upper cover of combination Instrument panel decorative sheet 4. Combination switch assembly 5. E-type Retainer Ring 6. Bolt 7. E-type retainer ring 8. Erection bolt 9. Erection bolt 10. Bushing 11. Bushing 12. Steering shaft welded assembly

Note: Steering column will be easily damaged once it is disassembled from vehicle.
The end of steering column assembly may damage or loosen the steering shaft due to collision if it slides off.
Plastic shear lock pin for keeping length of steering column

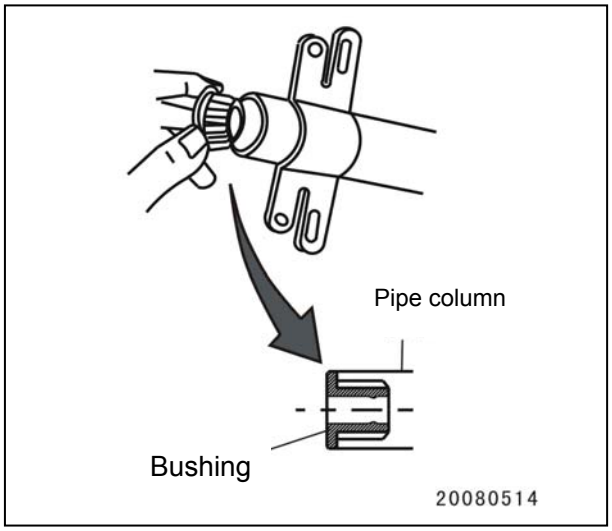


2.2.5 Disassembling Sequence

1. Disassemble steering wheel module.
2. Disassemble protective shell module of combination switch and combination switch assembly.

Key points of installation:
1. Application of grease lubricant.

Apply grease lubricant as shown in the figure.

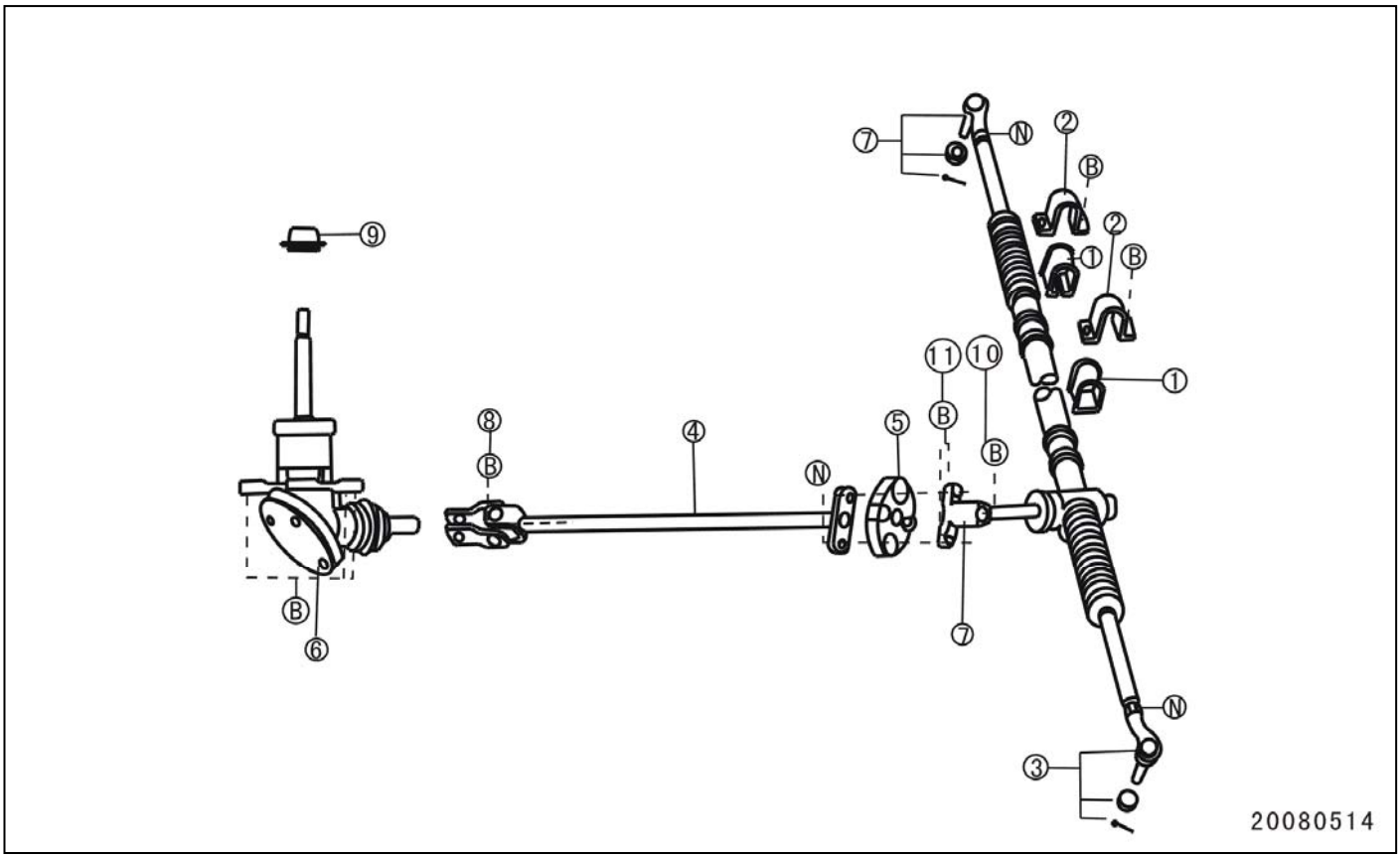


2.2.6 Bushing

Use rubber hammer to install bushing in the column.

Attention
● **When installing a new bushing, do not make it excessive distortion or crack.** ● **Bushing should match well with the column.**

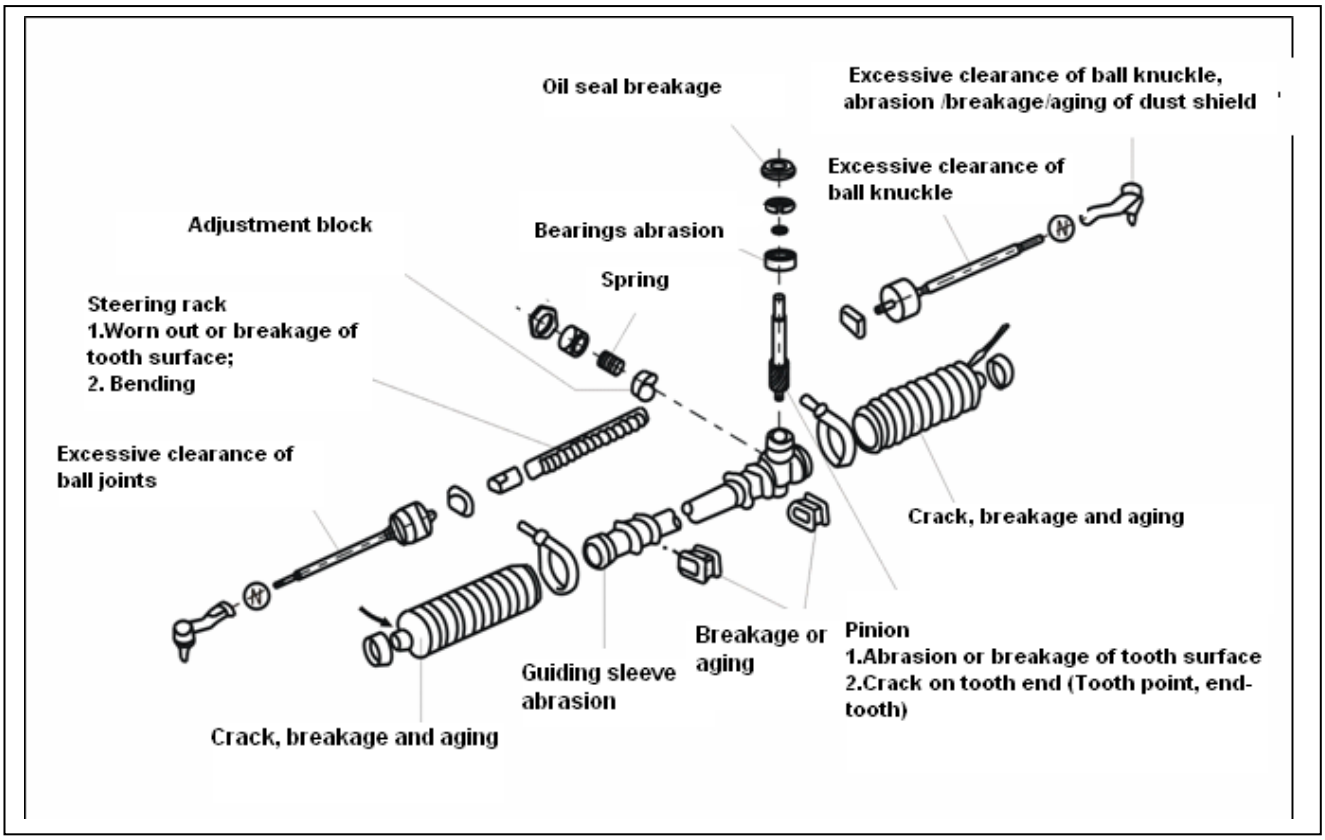
2.3 Location Map of Steering Gear Assembly



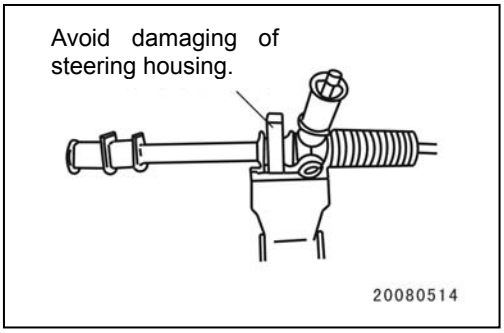
Note：

It is necessary to take off clutch release cable when disassembling front axle welded assembly and adjust it after installing front axle welded assembly well.

2.3.1 Exploded View of Steering Gear

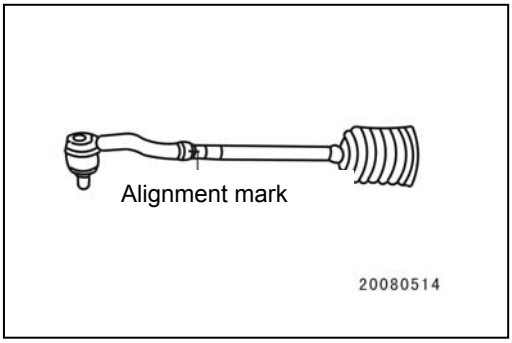


1. Mount the steering gear onto the jaw vice.

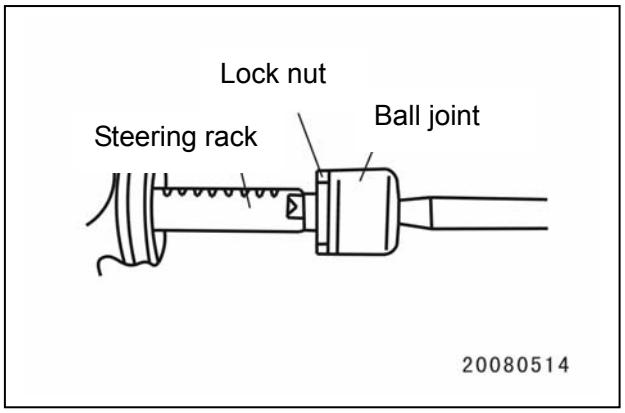


2. Alignment mark on the joint ends of tie rod and steering.

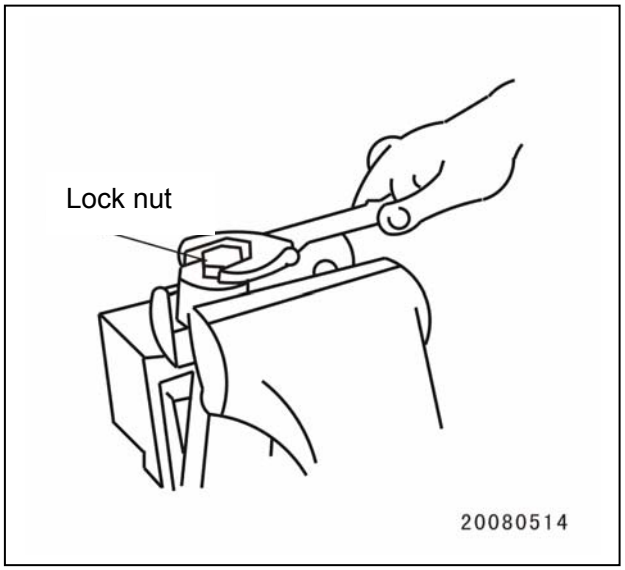
Attention
Distinguish between the left and right end.



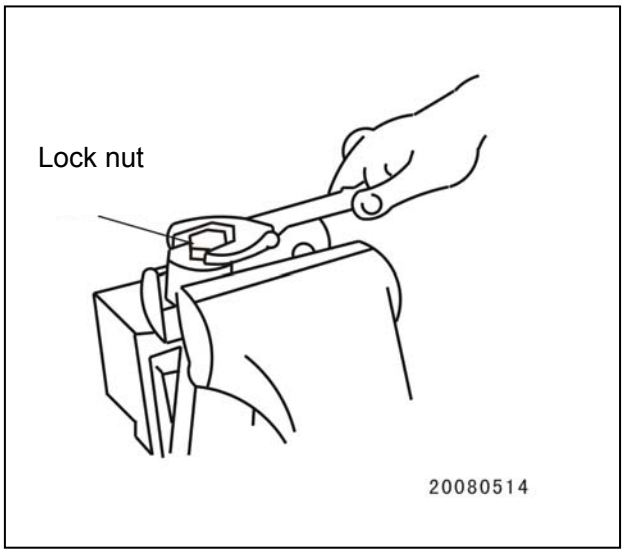
3. Remove the rubber bushing.
4. Disassemble the tie rod plinth assembly
5. Disassemble the self-tightening spring
6. Disassemble tightening hoop tape.
7. Remove expansion rubber sleeve.
8. Disassemble the tie rod ball joint assembly.



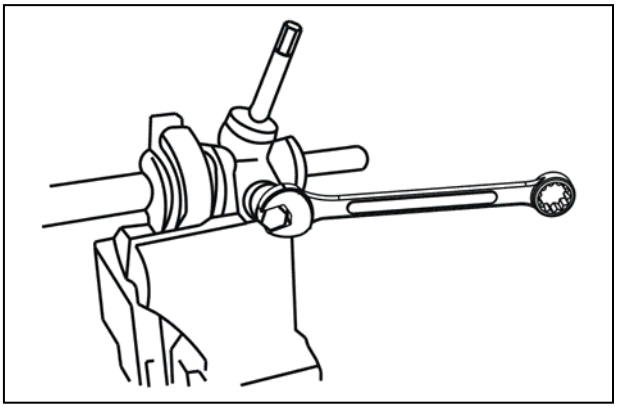
9.Install the tie rod ball joint assembly in jaw vice to take off lock nut.



10. Adjust the plug screw lock nut

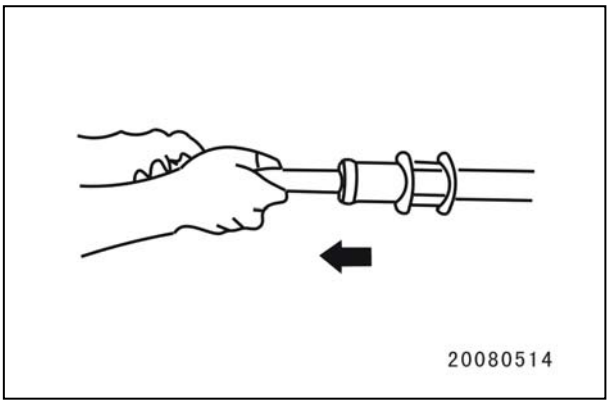


11. Unscrew adjusting plug screw
（1）Unscrew adjusting plug screw.
（2）Take off adjusting spring and block.



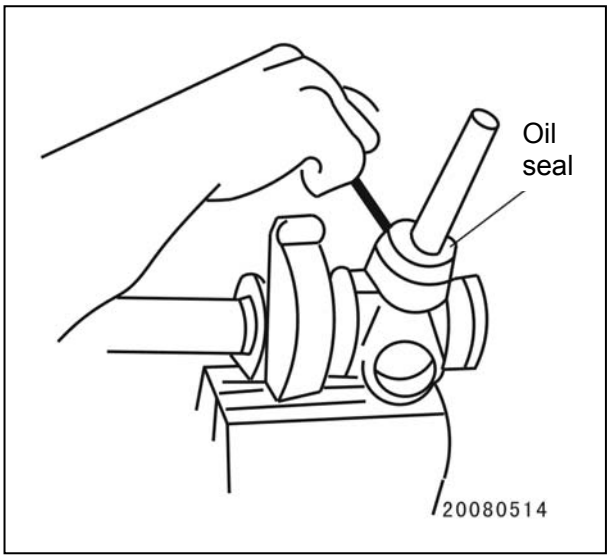
12. Take off steering rack

Attention
Pull the rack out of housing from side as shown in the figure to avoid damaging rack guide bushing. **Do not rotate the rack and keep it flat and straight when pulling it out.**



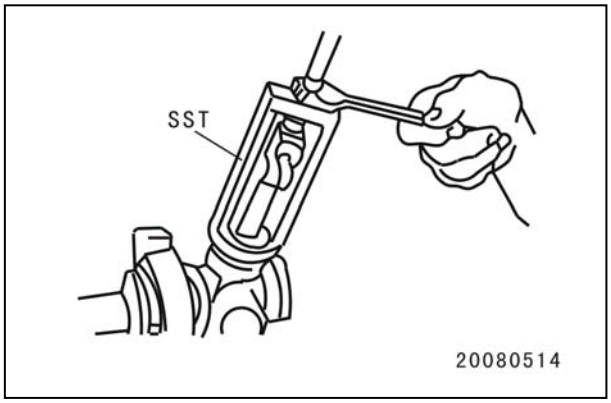
13. Dismantle oil seal with a screwdriver.

Attention
Particular attention should be paid not to damaging steering housing when dismantling. **Do not reuse the dismantled oil seal.**



14. Remove retainer ring with a circlip pliers.

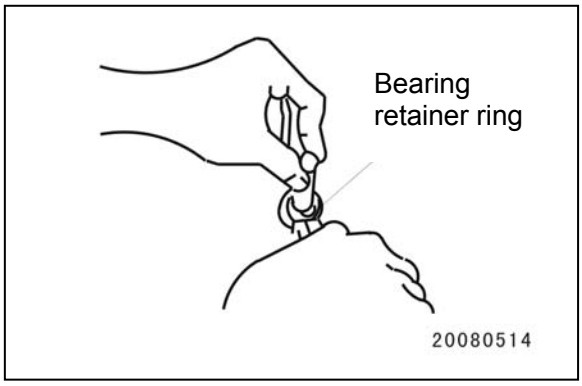
Attention
Do not reuse the removed retainer ring.



15. Disassemble steering rack and bearing.

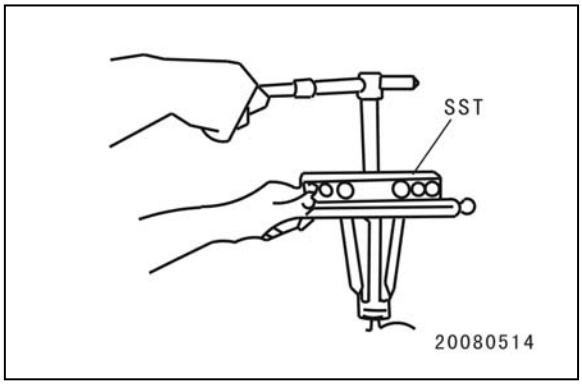
16. Remove bearing retainer ring with a circlip pliers.

Attention
Do not reuse the removed retainer ring.

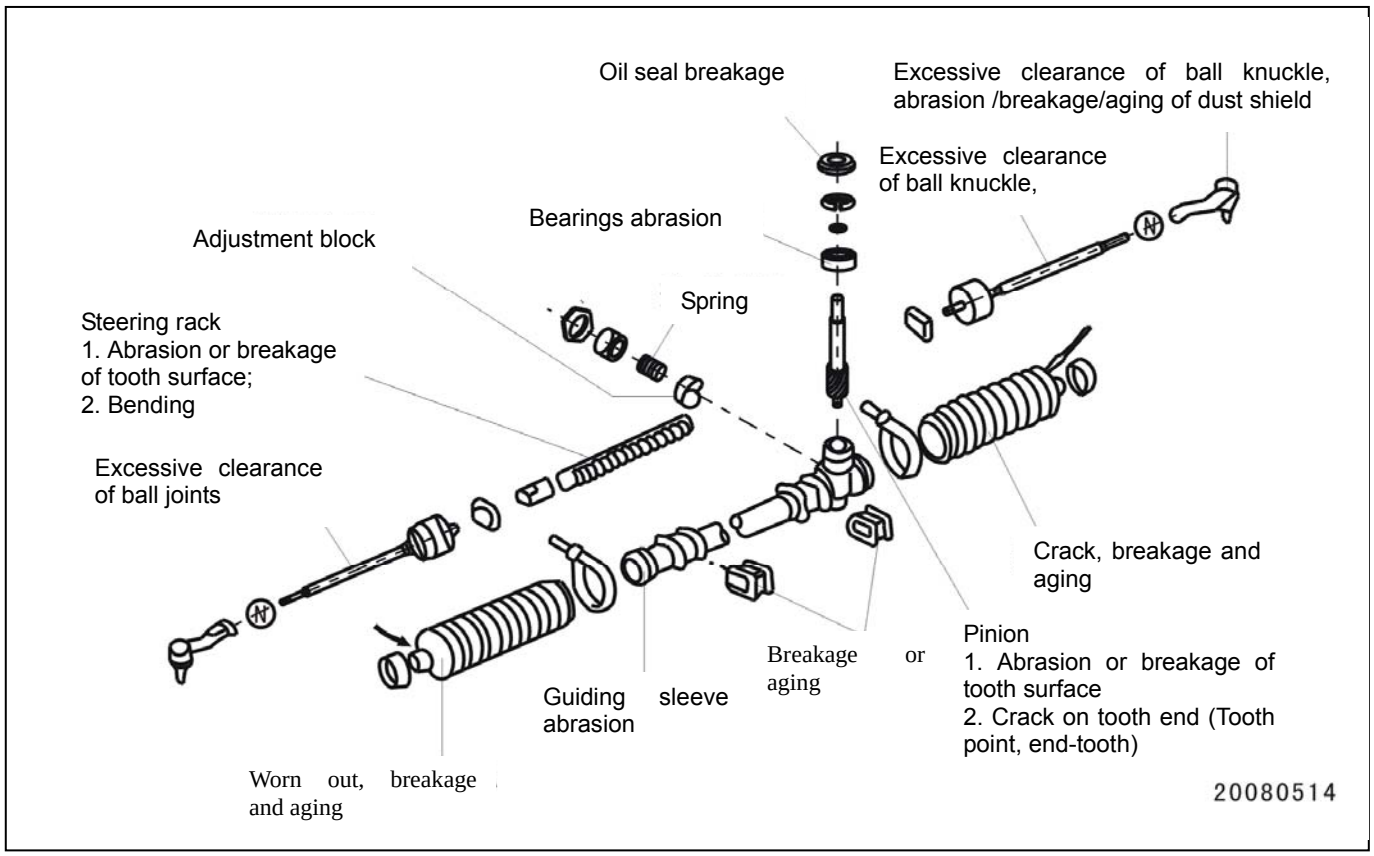


17. Disassemble ball bearing with a puller.

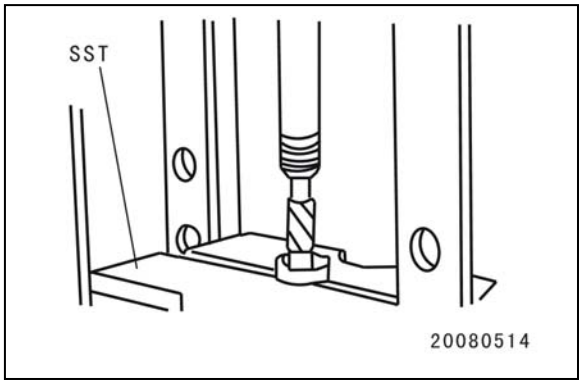
Attention
Do not reuse the removed ball bearing.



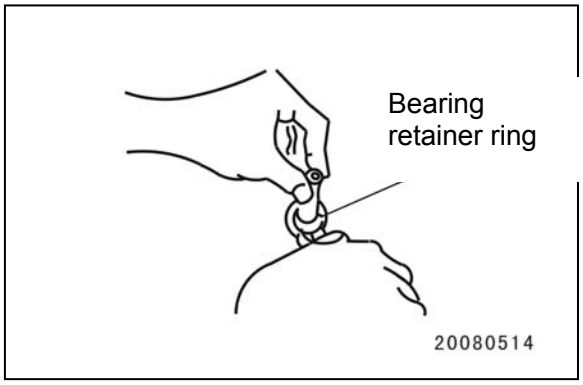
2.3.2 Assembling Sequence Chart



1. Assemble new ball bearing onto steering gear wheel

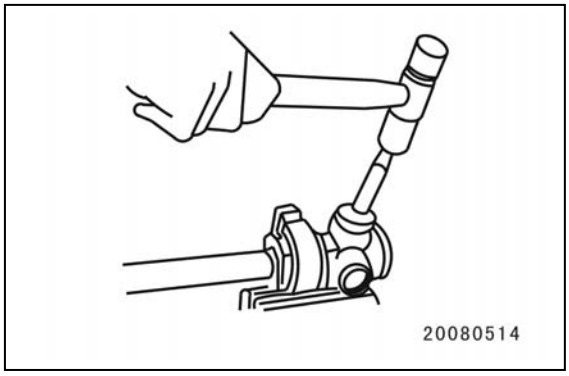


2. Assemble the gear ring onto steering gear wheel with a circlip pliers

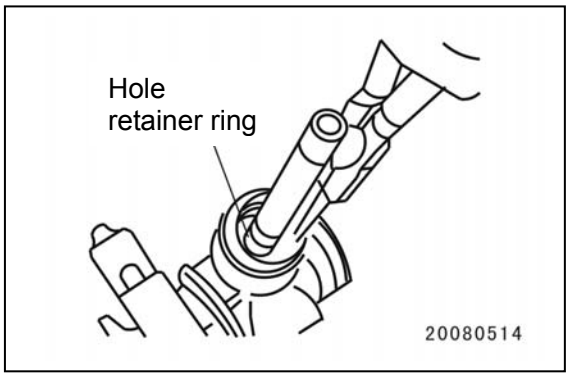


3. Assemble the steering gear wheel onto steering gear housing with a rubber hammer.

Attention
Always knock gently when mounting the steering gear wheel.

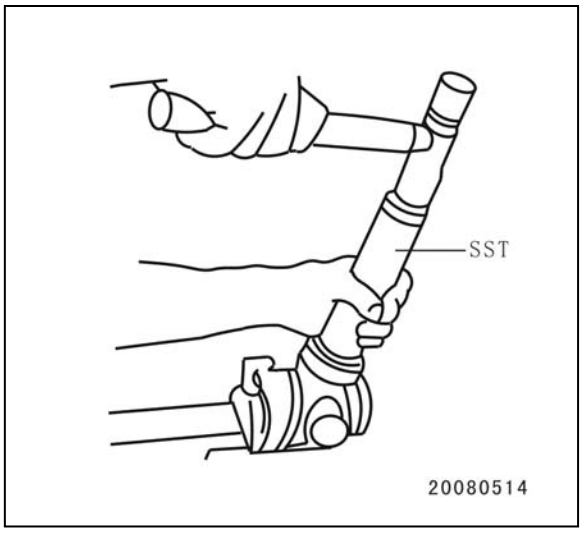


4. Assemble new retainer ring with a circlip pliers.



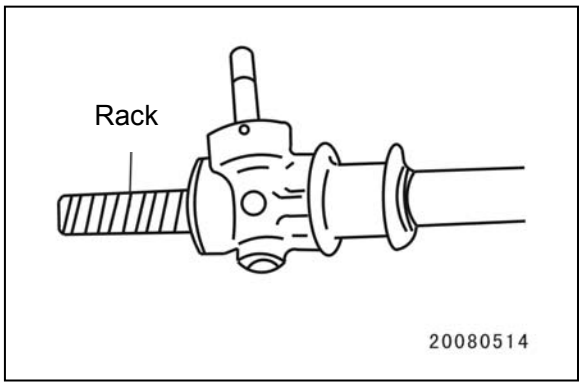
5. Assemble the oil seal into the steering gear housing.

Attention
Make sure the interface between oil seal and steering gear housing is free of grease lubricant.



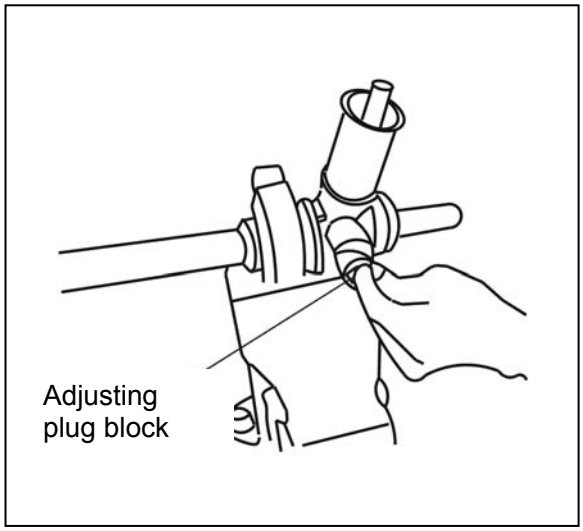
6. Assemble the steering rack onto the steering gear housing

Attention
Apply grease lubricant on the whole outer surface and teeth surface of grease steering rack. Do not damage steering rack bushing when assembling.



7. Assemble the adjusting plug block.

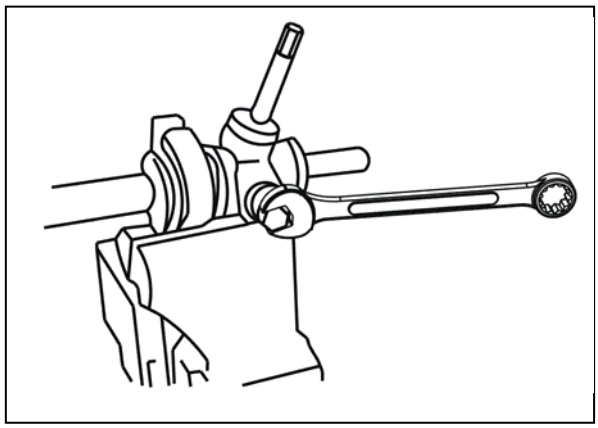
8. Assemble the adjusting spring.



9. Starting torque adjusting system

1> Screw down the steering rack with a spanner to adjust the plug screw according to the specified torque.
Tightening torque is 11-15N • m

2> After step 1, return the plug screw to 45°～55° back.

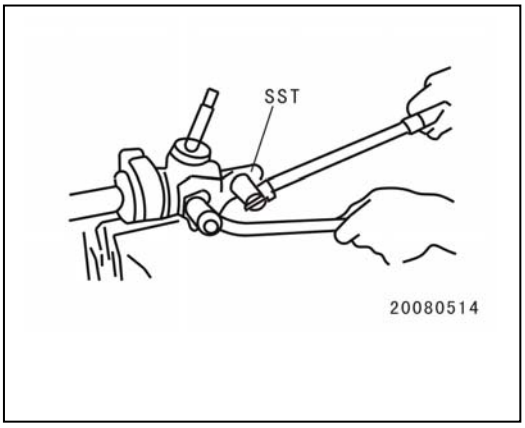


3> Measure the staring torque with a tension wrench. Repeat the process from step 1 to step 3 if unqualified.

Specified torque is defined as 1.5～1.6 N·m.

4> Keep adjusting plug screw immovable still and screw it down as per specified torque of 35~45N • m

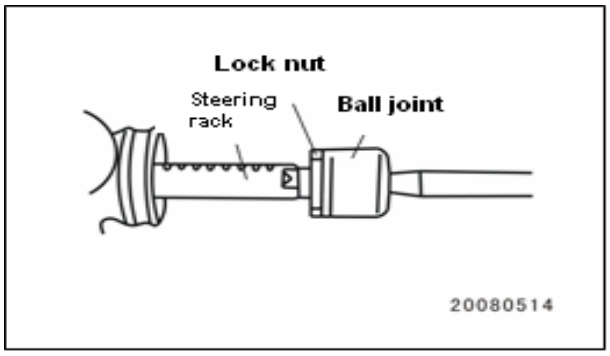
5> Remeasure starting torque of 1.5～1.6N·m.



10. Assemble the tie rod ball joint assembly

1> Screw the lock nut down to thread bottom of tie rod ball joint assembly (The big end of lock nut faces to tie rod ball joint assembly)
2> Assemble the tie rod ball joint on the steering rack under status 1
3> Tighten the steering rack and lock nut as per the specified torque.
Specified torque: 50~60 N·m.

.



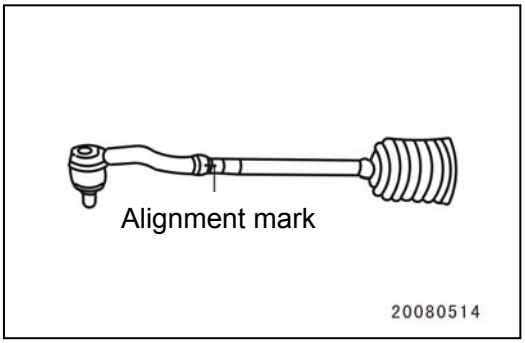
11. Assemble the expansion sleeve.

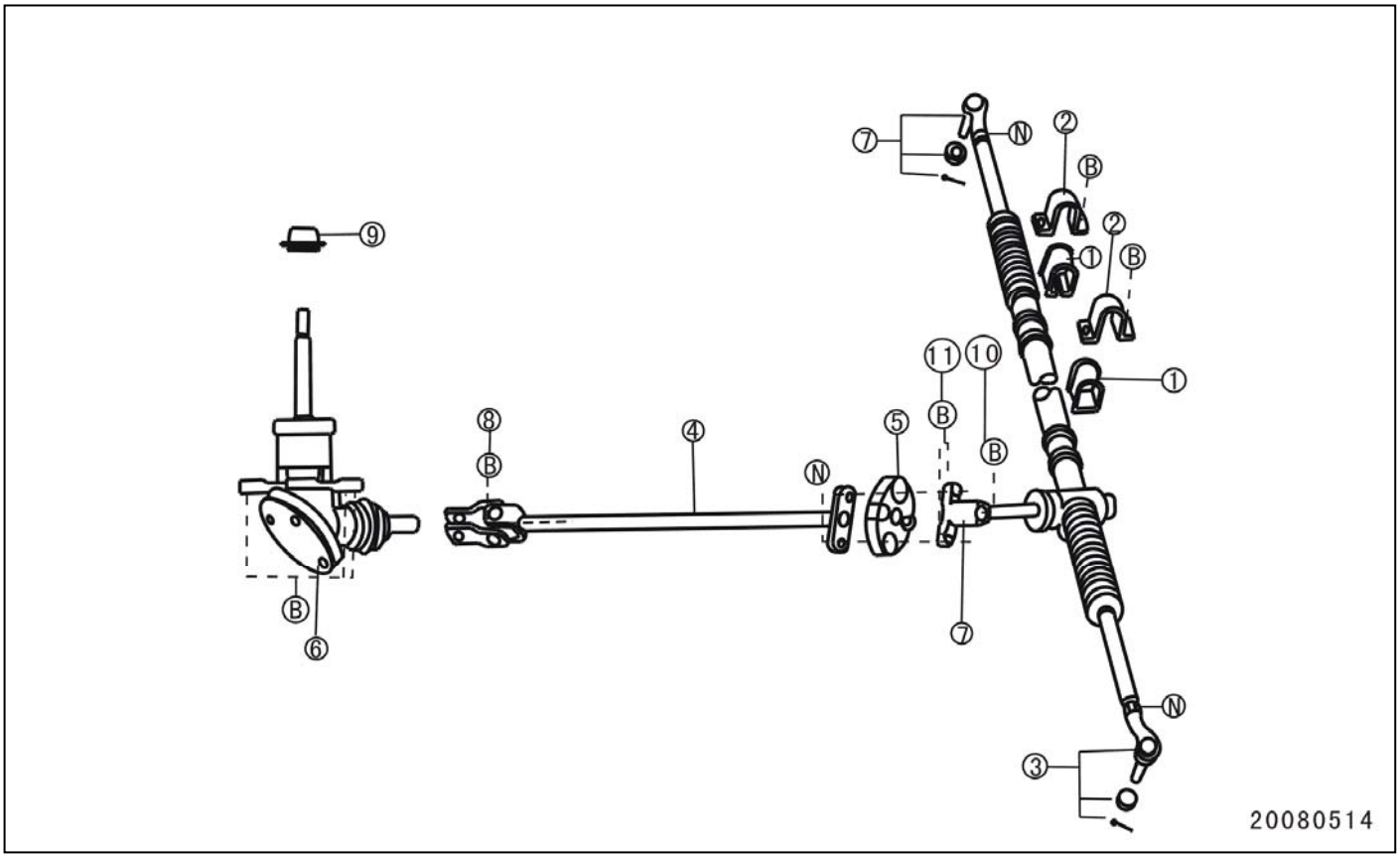
12. Assemble a new tightening hoop tape.

13. Assemble a new spring hoop.

14. Assemble a new plinth assembly.
Specified torque: 32~48 N • m.

Attention
Connect the tie rod end to the steering rack as per alignment mark.





1.Rubber boot of steering gear 2. Mounting bracket of steering gear 3. Plinth assembly of tie rod
4. Lower driving shaft assembly 5. Flexible connection assembly 6. Steering bevel pinion assembly
7. Spline joint 8. Rubber sleeve assembly

2.4 Front Wheels Alignment Parameters

2.4 .1 Front wheels Alignment Parameters of D150 Equipped with B12 Engine

Items	Scope
Camber angle	30′±30′
Caster angle	2°±45′
Toe in	-3 mm～2mm/-15′～10′
Kingpin inclination angle	14°20′±1°

2.4.2 D150 Equipped with Engine Manufactured by Liuzhou Wuling Liuji PowerCo.，Ltd

Items	Scope
Camber angle	1°±30′
Caster angle	2°42′±1°
Toe-in	0～3mm
Kingpin inclination angle	14°20′±1°

2.4.3 Tire Pressure

Tire Model	Type	Idle Load（kpa）	Full Load (kpa)
175R13LT	Front tire	200	200
	Rear tire	200	300

Check on wheel radial and lateral run-out
Radial run-out: Not more than 0.8mm
Lateral run-out: Not more than 1.0mm

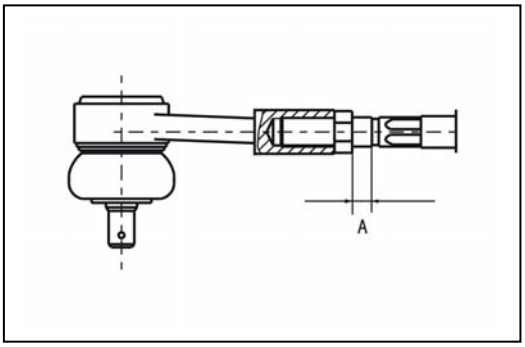
2.4.4 Check on Clearance

1. Jack up the vehicle and push or pull each wheel alternately so as to make sure tires' installation and clearance are mounted in the defined scale.
2. If the wheel clearance is overlarge, step on the brake pedal and check if:
If the clearance between the wheels disappears; front wheel braking bearings may be loosened.
If clearance between the wheels retains, the installation face of steering knuckle, front shaft or front suspension may be loosened.

2.4.5 Check and Adjustment

Adjustment of Toe-in
1. Loosen the lock nut of tie rod.
2. Rotate the tie rod joint and adjust the Toe-in.

Attention
● **Do not distort or damage dust guard when adjusting.**
● **Adjust the same length of left and right tie rods when adjusting Toe-in.**
● **The left and right lengths as shown in the figure should be equal, otherwise, left and right rotating angles may be different when turning.**



Chapter 3 Suspension, Wheel and Tire

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3.1 Check and Adjustment of Suspension System

3.1.1 Preparation before Check on Front Wheel Alignment

It is necessary to carry through all check-up and maintenance works below before starting to check and adjust the auto front wheel alignment, so as to ensure the correctness of alignment parameter when measuring and adjusting.

（1）Check all wheel tires, replace the one hose abrasion level is not equal on the right and the left, either that of seriously and partially abraded with new one.

（2）Check wheel air pressure: (Empty load)

	Front-wheel	Rear-wheel
Pressure	200KPa	200KPa

（3）Check tire's radial and lateral run-out quantity:
Requirements: Radial run-out<3mm
Lateral run-out<3mm

（4）Check all components of suspension ,replace the one that appears to be deformed and damaged.

（5）Check all fasteners among the components of suspension, tighten the loosing one as per relative specifications requirements.

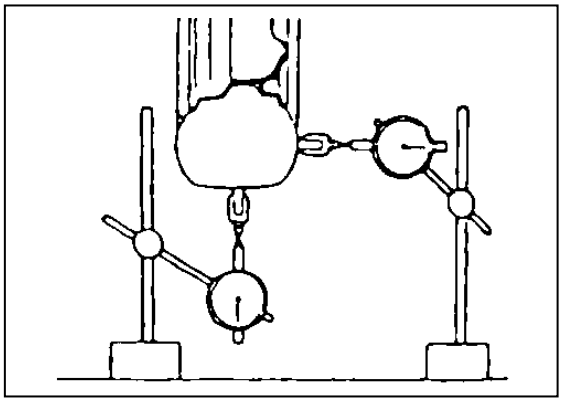
（6）Check the steering tie rod end, modify the loosing one before adjusting.

（7）Check and make sure the measurement apparatus is under a good condition, operate it according to the instructions provided by the factory.

3.1.2 Check and Adjustment of Front Wheel Alignment

1. Wheel Alignment Parameter

Items		Parameter
Toe In		0～3mm
Camber Angle		1°±30′
Caster Angle		2°42′±1°
Kingpin Inclination		14°20′±1°
Rotation Angle	Inner Wheel	37°10′±2°
	Outer Wheel	32°46′



2. Check and Adjustment of Toe In

（1）Toe In Measure: Push an empty loaded vehicle 5m on a smooth and plane surface by keeping its wheels in a straight and forward condition. Measure the center distance “A” and “B” of the front and rear wheel tread between its two front wheels.

Attention
No backward running of the vehicle is allowed when measuring.

Toe In Value（B-A）: 0～3mm

（2）Toe In Adjustment: Adjust the toe in by modifying the steering linkage in length.

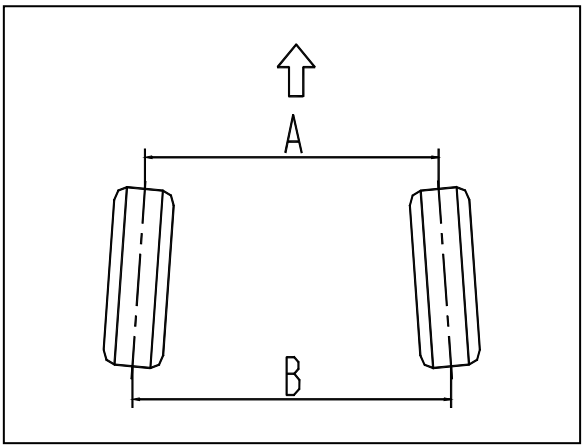
First of all, loose the right side and left side steering tie rod locknut 3, and apply grease on steering tie rod and small end hole of gear rack dust guard to avoid twists when adjusting the toe in.

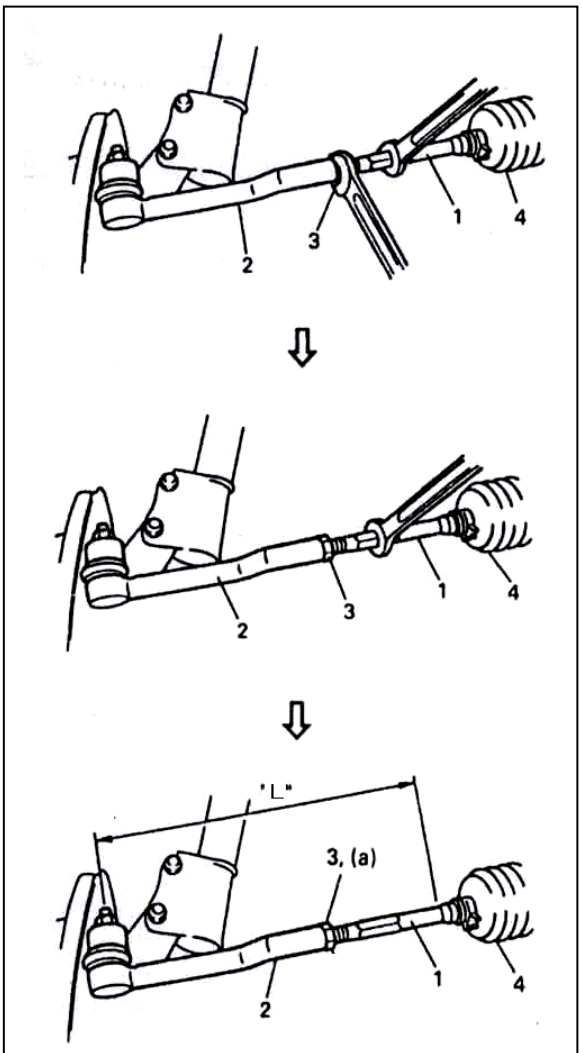
Secondly, adjust the toe in as per pre-setting parameter required by rotating the right and left steering tie rod with an identical torque, pay attention to ensuring the distance “L” between the right side and left side of ball pin and the root segment of tie rod is equal when adjusting.

After that, tighten the steering tie rod locknut as per the specified torque.

（3）Tighten Torque

Steering Tie Rod Locknut (a) :50～65N·m





1. Steering tie rod
2. Steering tie rod plinth assembly
3. Steering tie rod locknut
4. Gear rack dust guard

3. Check and Adjustment of Camber Angle, Caster Angle and Kingpin Inclination

Adopt front wheel alignment measurement instrument to measure Camber Angle, Caster Angle and Kingpin Inclination.

Keep the vehicle in a toe in measure condition, then take measurement after pressing the front end of the vehicle up and down for several times.

Identify the reasons should come first when the difference occurs in data. If the problem happens to suspension components that appear to be damaged, loosed, bended, hollowed or abraded, replace them. If the problem happens to the vehicle body that seems to be deformed, maintain it to reach the technical requirements.

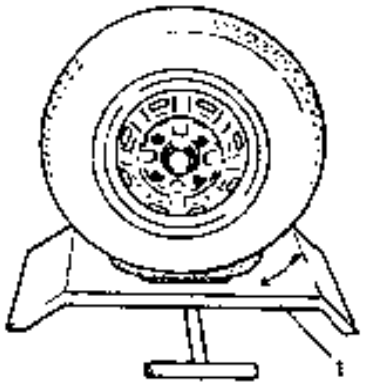
4. Max Steering Angle

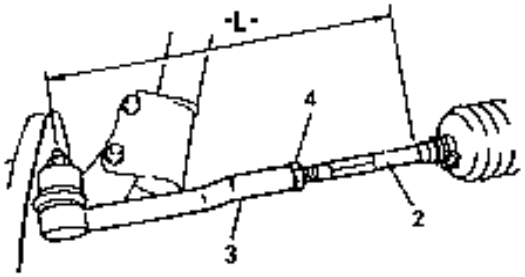
Check the toe at first and then measure the steering angle by using steering angle measurement instrument when replacing the steering tie rod or steering tie rod plinth assembly. If the steering angle is wrong, adjust the length “L” of the right and left steering tie rod to make the D-value of the right and left inside steering angle is not more than 45′.

Attention
·The toe in must be re-checked if the length of steering tie rod has been changed due to steering angle modification.

Steering Angle Inside: 37°10′±2°

Outside: 32°46′





1. Steering angle measurement instrument
2. Steering tie rod
3. Steering tie rod plinth assembly
4. Steering tie rod locknut

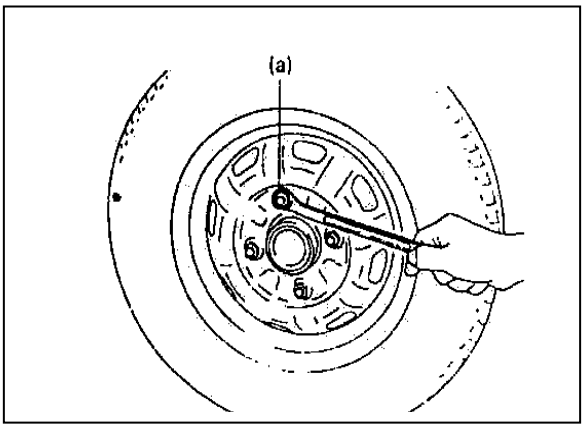
3.1.3 Check of Wheel Rim, Nut and Wheel Hub Bearing

（1）Check every wheel rim on each wheel to make sure whether it has been sunken, deformed or crackled, especially on those four bolt holes. If it appears to be crackled, damaged and deformed seriously, replace it.

（2）Check that the wheel nuts are tightened well. Re-tighten it according to the specified tightening torque if necessary.

Tightening Torque:

Wheel Nut(a) 88～117N·m



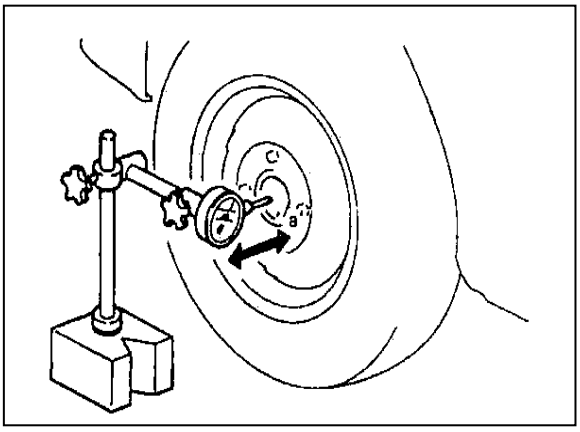
（3）Check the Abrasion Condition of Wheel Bearing

Front Wheel:

Jack up the front axle to make the wheel away form the earth; take off the decorative cover of wheel and the inner cover of front hub. After that, measure the thrust clearance of wheel hub bearing by using a dial indicator on hub.

Ultimate value of thrust clearance “a”：0.1 mm

Replace the hub assembly once the measure value exceeds the ultimate value.

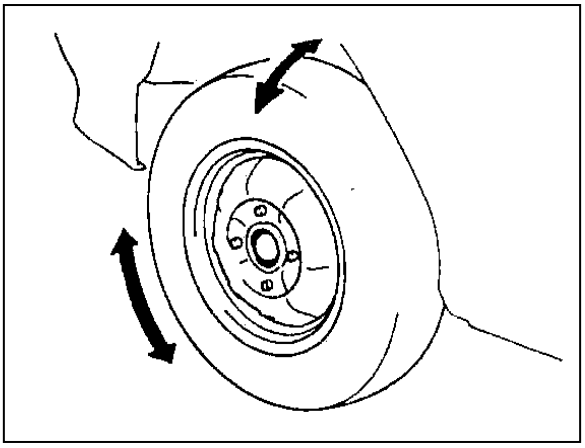


Rear Wheel:

Jack up the rear axle to make the wheel away form the earth; take away the decorative cover of wheel. After that, measure the thrust clearance of bearing by using a dial indicator on the semi-axis center of rear axles.

Ultimate Value of thrust clearance “a” ： 0.8mm

Replace the bearing once the measure value exceeds the ultimate value.



（4）Make wheel running to check whether there is any noise on wheel bearing or smooth in running. If yes, replace the wheel hub assembly or bearing.

3.1.4 Check on Front and Rear Shock Absorber in Failure

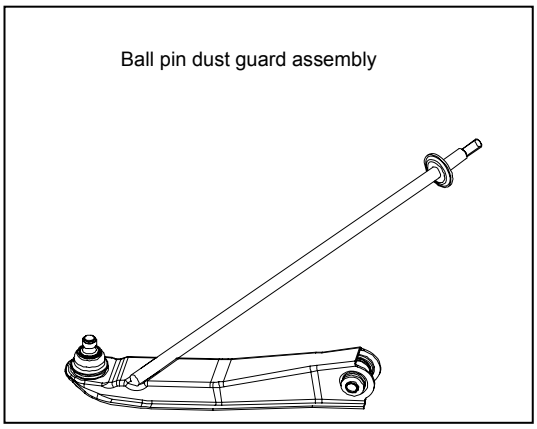
Check that the vehicle runs smoothly first. If there is abnormal shock feeling when driving or noises such as “dong dong” in cab when driving on non-smooth road, stop the car and press one side of the car forcibly to check whether the car sways three or four times, if yes, that means the performance of shock absorber has got poor. Then check if there is a leakage of oil in the shock absorber. When removing the shock absorber, check whether the piston rod is retardation or there is no resistance when it is pushed or pulled. If there were one of that as shown above happen, the shock absorber should be replaced.

Attention
There is no repair for shock absorber, replace the whole one only.

3.1.5 Check on the Rubber Parts of Suspension System

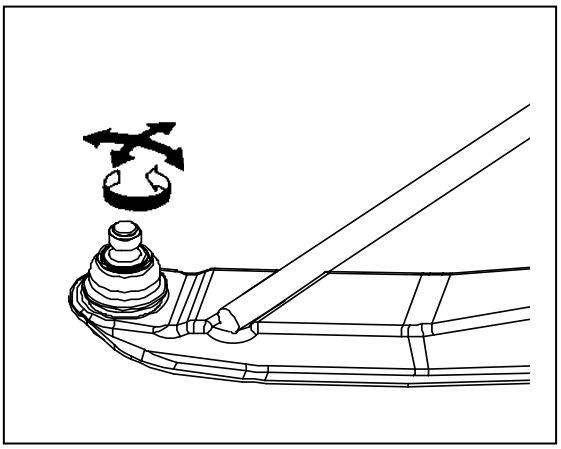
Check the components of shock absorber, such as damping block and dust guard of piston rod, bumper block of up pivot assembly (front suspension support), rubber on support bar, bushing and axle sleeve of lower swing arm, bushing of steel plate spring, cushion rubber of rear suspension, etc.. If there were something broken and cracking on them, replace them immediately.

Don't mix with any oiliness, for it is not a kind of oil resistant cushion rubber. It would be better to be lubricated by using soapsuds when disassembling or assembling.



3.1.6 Check on Ball Pin, Leaf Spring and Coil Spring of Suspension System

1. Pay more attention to the oil sealing performance of dust guard on the RH& LH swing arms and the ball pin assembly. Once it appears to have an oil leak phenomena, replace it with a dust guard filled grease lubricant. Besides that, check if the swing and rotating of the ball pin are flexible or loose.
   Under the normal temperature, the rotating force moment of ball pin on the swing arm: 0.5～1.5N·m
2. To observe whether there is a height difference between the right side and left side of the car under the condition of tires’ normal pressure and car’s empty load. If they are not, to find whether there is a length difference between the right coil spring and left one of the front suspension, or strip break on leaf spring of rear suspension. Replace the coil spring or leaf spring once the above situations happen.



3.1.7 Tightening Check of Fastener

Tightening torque of front suspension fastener

	Fastener	Torque
1	Steering tie rod locknut	50～65N • m
2	Wheel nut	88.3～117.7N • m
3	Brake caliper fastening bolt	75～95N • m
4	Nut on the tip of shock absorber piston rod	49～68.3N • m
5	Upper nut on the front suspension support assembly	39.2～49N • m
6	Connecting nut between steering knuckle and front shock absorber	85～95N • m
7	Connecting Nut between swing arm ball pin and steering knuckle	55～65N • m
8	Connecting nut between swing arm and front axle welded assembly	78.4～98.1N • m
9	Bolt assembly on the connecting between Left(Right) support of knighthead and front girder	68.6～78.4N • m
10	Front nut of knighthead welded assembly	68.6～88.3N • m
11	Bolt assembly on the connecting between front axle welded assembly and front girder	68～79N • m
12	Bolt on the steering gear assembling support	31～48N • m

3.2 Front Suspension

3.2.1 Specifications

Suspension mode:

MacPherson strut type independent suspension

Coil Spring

Steel Wire diameter×Outside diameter×Free Length（mm）：φ12.3×φ97.3×276

Spring Stiffness（N/mm）：53.9±3.7

Cycle Number：6.78

Shock absorber：

Mode: Drum type hydraulic bilateral effect

Effective Movement（mm）：≥130

Damping Force (0.3m/s)

Speed V=0.3m/s

Restoring Resistance（N）：1304±186

Contraction Resistance（N）：353±78

Front Wheel Alignment

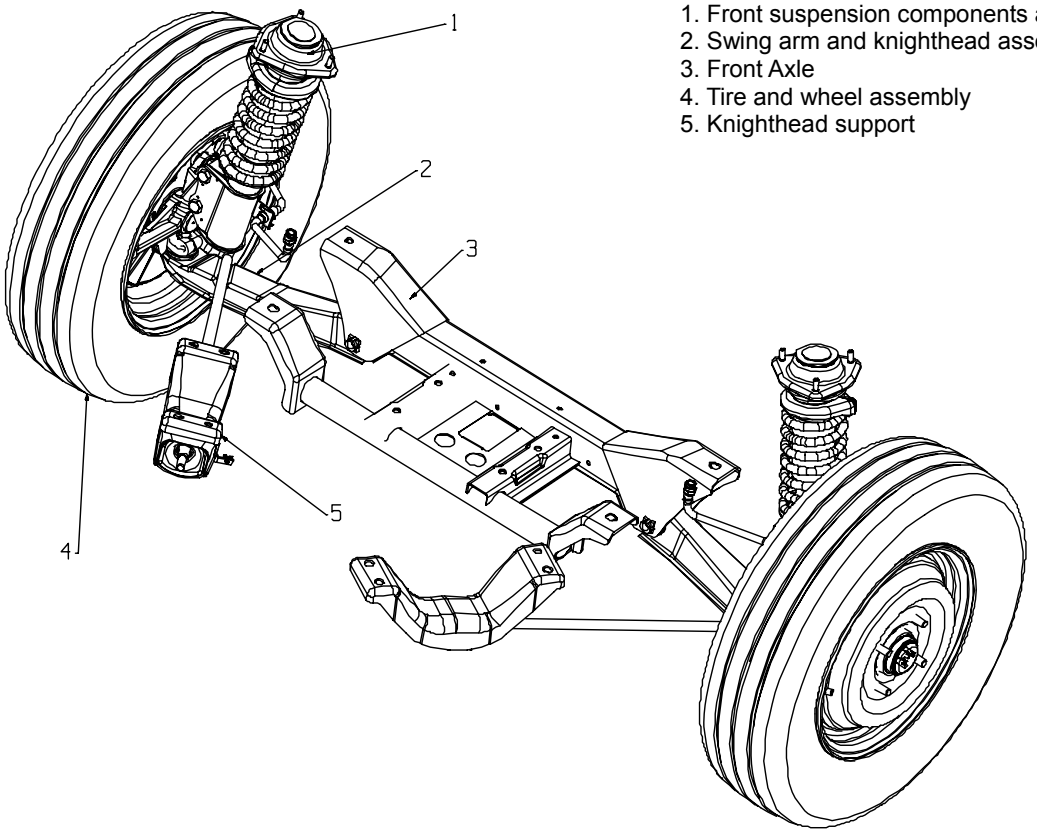
Toe In 0～3mm

Camber Angle 1°±30′

Caster Angle 2°42′±1°

Kingpin Inclination 14°20′±1°

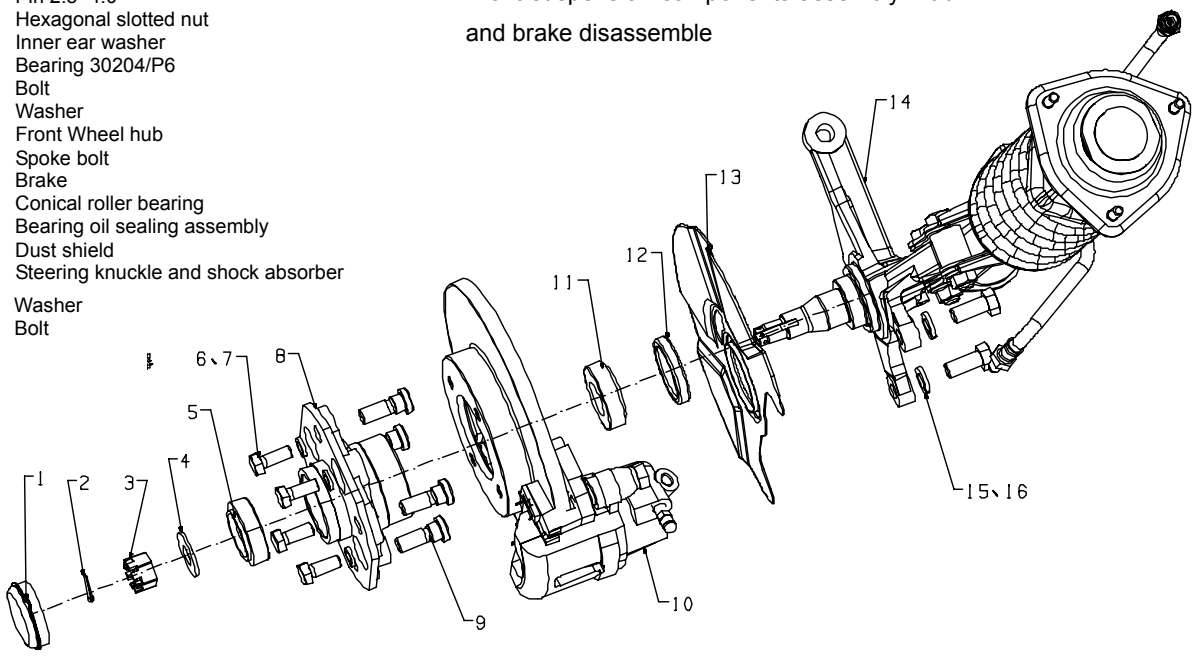
3.2.2 Front Suspension Assembly Drawing



1. Front suspension components assembly
2. Swing arm and knighthead assembly
3. Front Axle
4. Tire and wheel assembly
5. Knighthead support

1. Inner cover of front wheel hub
2. Pin 2.5×4.0
3. Hexagonal slotted nut
4. Inner ear washer
5. Bearing 30204/P6
6. Bolt
7. Washer
8. Front Wheel hub
9. Spoke bolt
10. Brake
11. Conical roller bearing
12. Bearing oil sealing assembly
13. Dust shield
14. Steering knuckle and shock absorber
15. Washer
16. Bolt

Front suspension components assembly: hub and brake disassemble



3.2.3.1 Front Wheel Hub Assembly

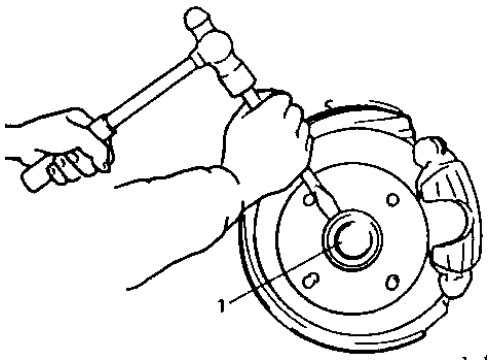
Disassembly:

（1）Jack up the vehicle from the earth reliably;

（2）Remove the front wheel;

（3）Remove the inner cover of front wheel hub;

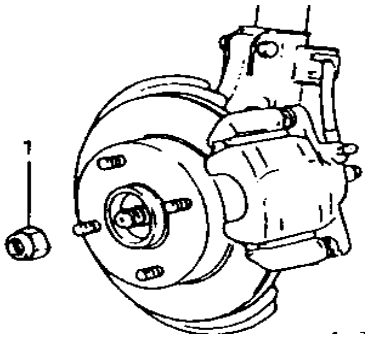
Knock three points around the inner cover of front wheel hub slightly with a screw driver as shown in the figure. Be careful not to damage the edge of inner cover due to collision.



1．Inner cover of front wheel hub

（4）After removing the split pin, loose and remove the locknut.

Attention
No reuse of the split pin is allowed after it is removed.

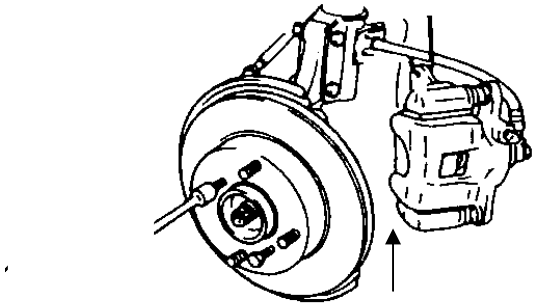


1.Hexagonal slotted nut

（5）Loosen off those two locknuts used for fixing the brake caliper assembly, and remove the brake caliper assembly.

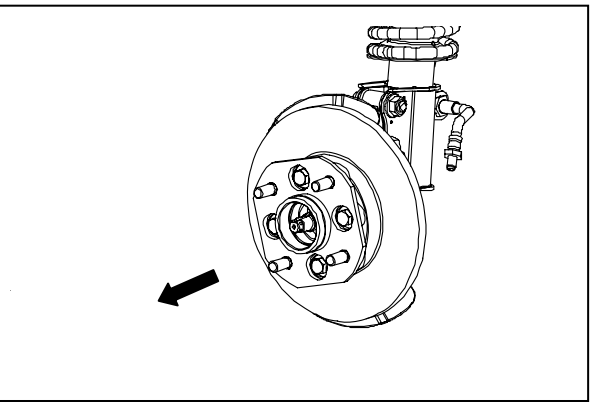
Attention
Do not pull out the brake hose from the brake caliper.

（6）Take off the wheel hub and brake puck.



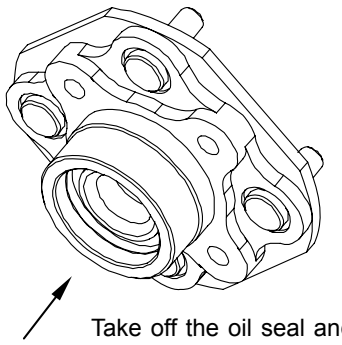
Lift up the brake caliper

（7）Remove the brake puck from the wheel hub.



（8）Remove the oil seal and the outer ring of bearing from the wheel hub.

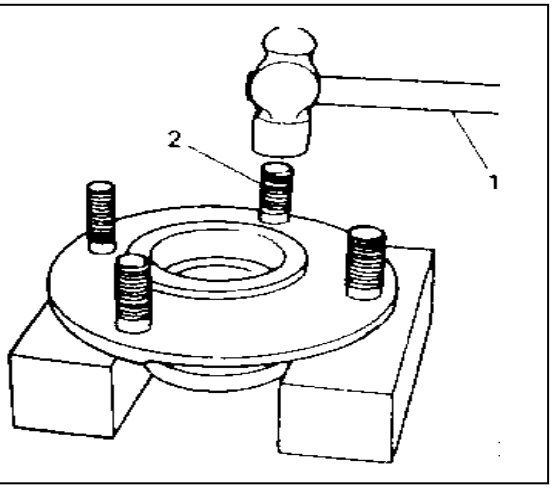
Attention
No reuse of the oil seal is allowed once it is removed.



Take off the oil seal and the outer ring of bearing

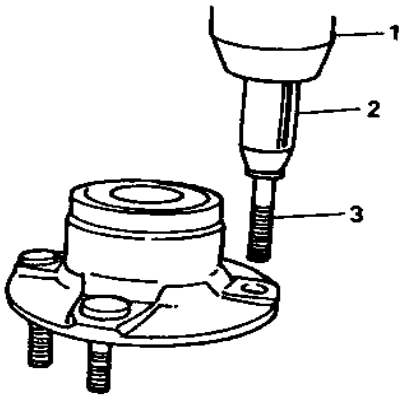
（9）Knock down the spoke bolt with a hammer.

Attention
No reuse of the spoke bolt is allowed once it is removed.



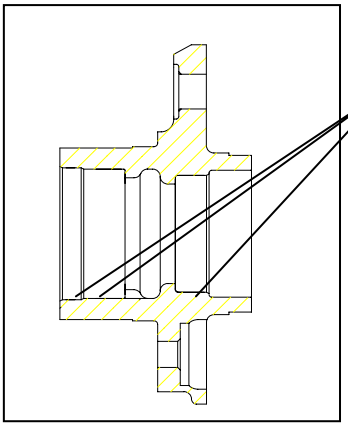
Assemble

（1）Spoke bolt assembling: Insert a new bolt vertically to the bolt hole of front wheel hub unit by pressure. If the front wheel hub unit has been used before, be careful to keep the straight grain of bolt root aligning to the straight grain inside of bolt hole.



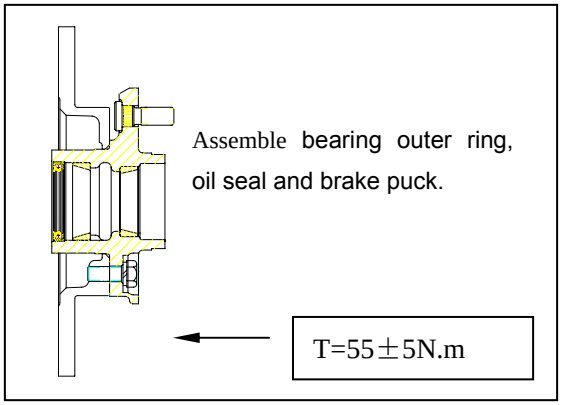
1. Press 2. Bumper block
3. Spoke bolt

（2）The oil seal and bearing outer ring must be coated with grease lubricant as shown in the figure before assembling.

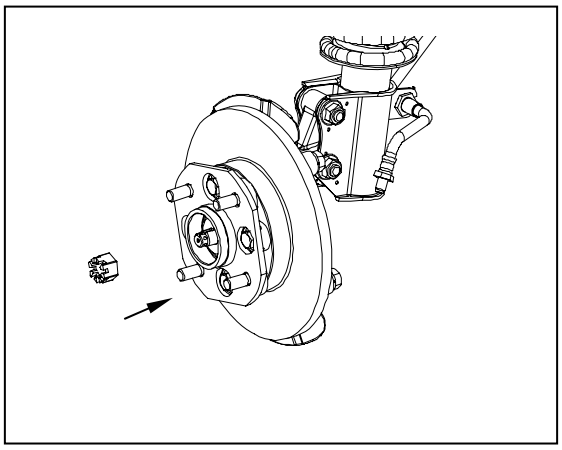


These three places are coated with grease lubricant.

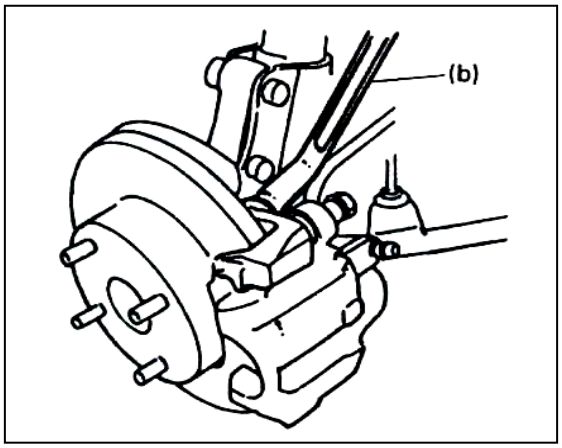
（3）Bearing outer ring, oil seal and brake puck assembling
Tightening torque of fastening bolt on brake puck: 55±5 N·m



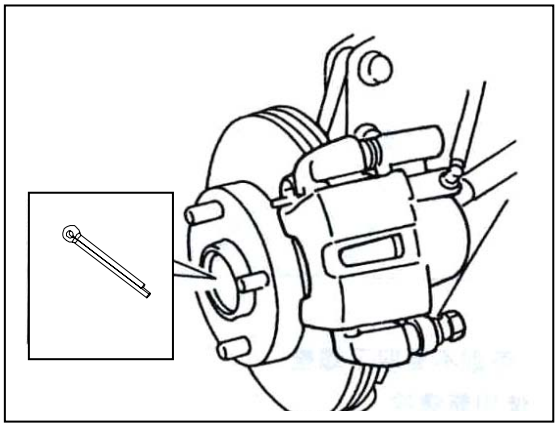
（4）Assemble the front wheel hub assembly onto the steering knuckle, and fastened it by a new slotted nut according to the requirements.
Fasten the nut up to a torque of 25.5～31.4N.m, and make the wheel hub done a reciprocating rotation for 2-3 cycles on the purpose of locating the bearing well. Loose the nut until the finger can dial it slightly, and then fasten it again to a torque of 5 N·m.



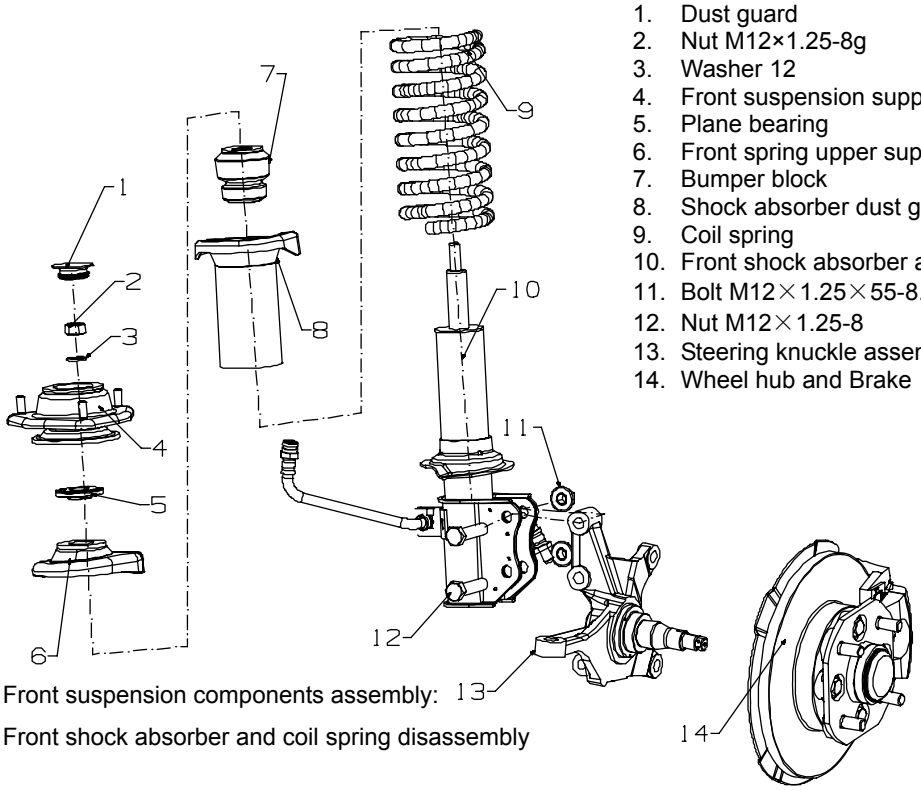
（5）Assemble the brake caliper assembly, and fasten the brake caliper fastening bolt by the specified torque.
Fastening torque value:（b）brake caliper fastening bolt 75～95 N·m



（6）After fastening the nut, insert the split pin for the purpose of locking.



（7）Assemble the inner cover of front wheel hub.
（8）Assemble the wheel well, and remove the jack.



1. Dust guard
2. Nut M12×1.25-8g
3. Washer 12
4. Front suspension support assembly
5. Plane bearing
6. Front spring upper support welded assembly
7. Bumper block
8. Shock absorber dust guard
9. Coil spring
10. Front shock absorber assembly
11. Bolt M12×1.25×55-8.8
12. Nut M12×1.25-8
13. Steering knuckle assembly
14. Wheel hub and Brake

Front suspension components assembly:

Front shock absorber and coil spring disassembly

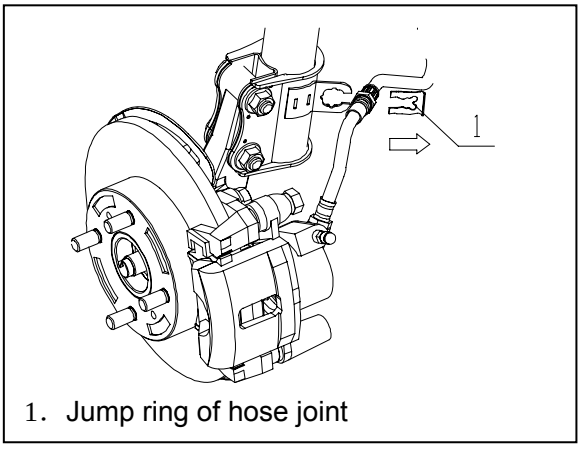
3.2.3.2 Front Shock Absorber and Coil Spring Assembly

Disassembly:

（1）Jack up the vehicle from the earth reliably;

（2）Take off the front wheel, steering tie rod and lower swing arm;

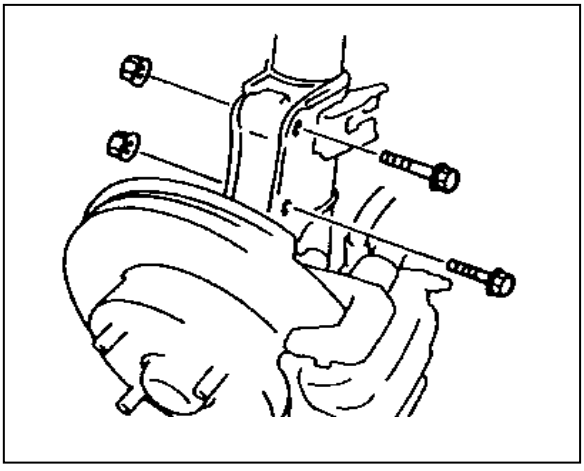
（3）Separate the brake hose and shock absorber by taking off the Jump ring of hose joint as shown in the figure;



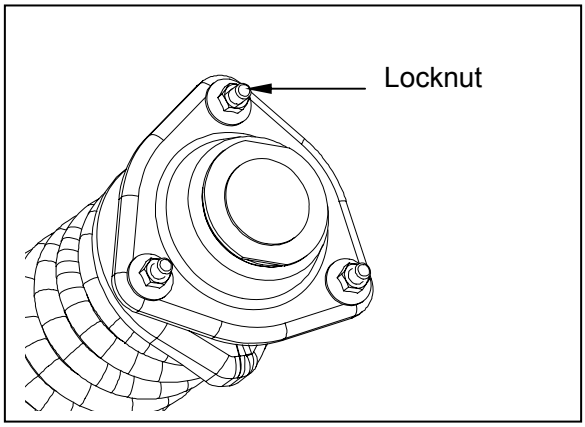
1. Jump ring of hose joint

（4）Take off the bolt for wiring hardness nip of wheel rotating speed sensor from the shock absorber (if it is provided);

（5）Take off the bolt on the connecting between the steering knuckle and front shock absorber as shown in the figure.

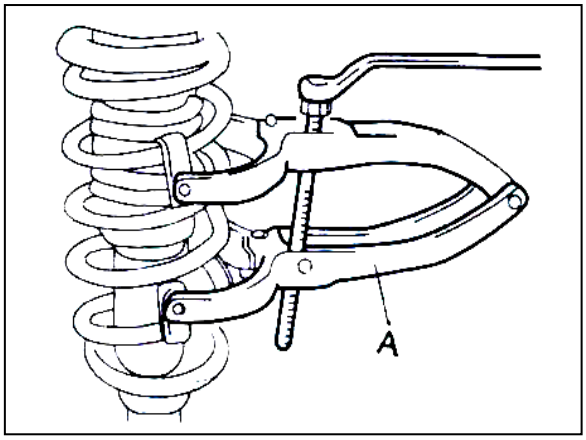


(6) Be careful to protect the front shock absorber and coil spring assembly and avoid any fall off of them when taking off those three locknuts from front suspension support assembly. Take off the front shock absorber and coil spring assembly.



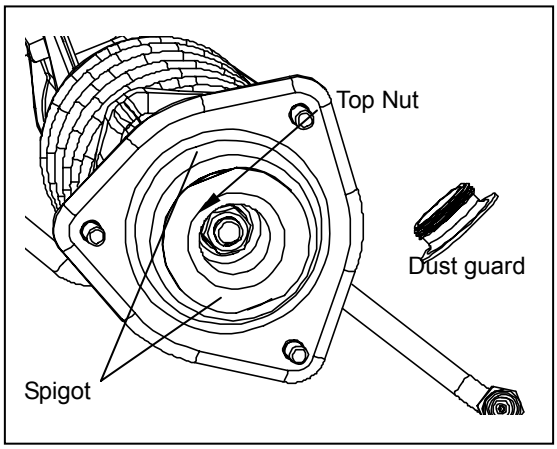
(7) Disassemble the front shock absorber and coil spring assembly:
Press the coil spring with a special tool until the force between coil spring and spring seat gets to zero.
Special tool: （A）Spring Compressor

Remove the dust guard from the front suspension support, and clip the spigot of stop dog hub frame with a fixture. Screw off the top nut of shock absorber piston rod.

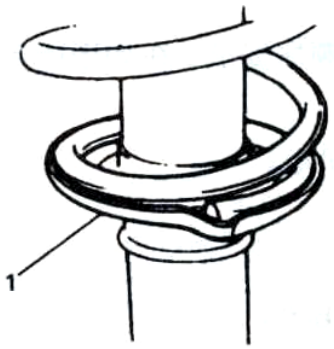


Take off the following parts in turn for checking, and replace the one that seems in bad situation with a new one:

1. Dust guard
2. Nut M12×1.25-8
3. Washer 12
4. Suspension support assembly
5. Plane bearing
6. Front spring upper support welded assembly
7. Bumper block
8. Shock absorber dust guard
9. Coil spring
10. Front shock absorber assembly
11. Bolt M12×1.25×55-8.8
12. Nut M12×1.25-8
13. Steering knuckle assembly
14. Wheel hub and brake



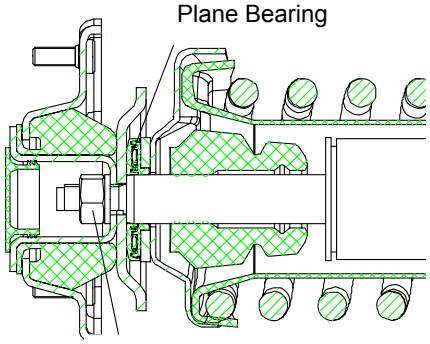
（8）Assemble the front shock absorber and coil spring assembly: Process the assembly with a reverse order of disassembly when assembling.



1. Front spring lower seat

Attention
The lower point of coil spring should match with the ladder form part of the front spring lower seat.

Attention
·The plane bearing should be located on the proper position.



Tightening torque:

（**a**）the top nut on the piston rod of shock absorber: 40～68.3 N·m

Assembly

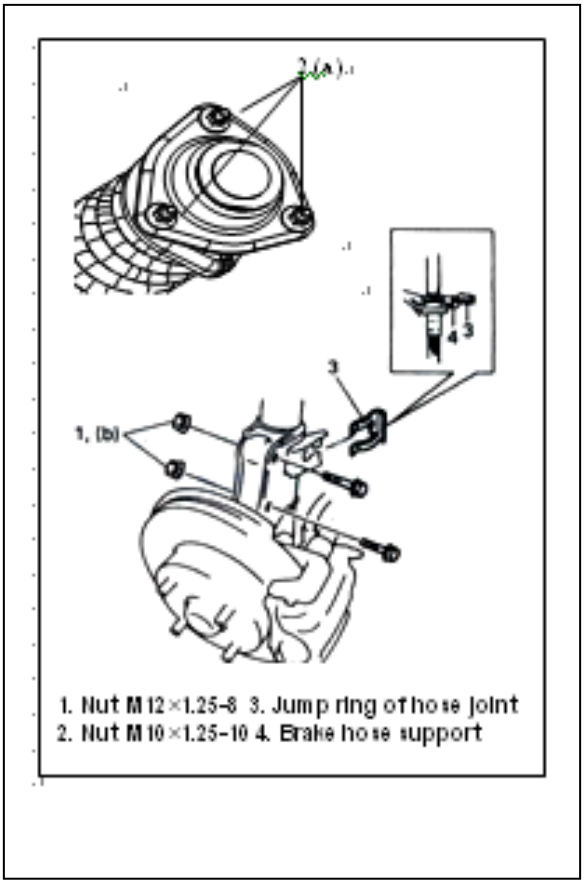
（1）Process assembly with a reverse order of disassembly (1) - (6), and adjust the fastener to the specified torque as shown in the figure.

Tightening torque:

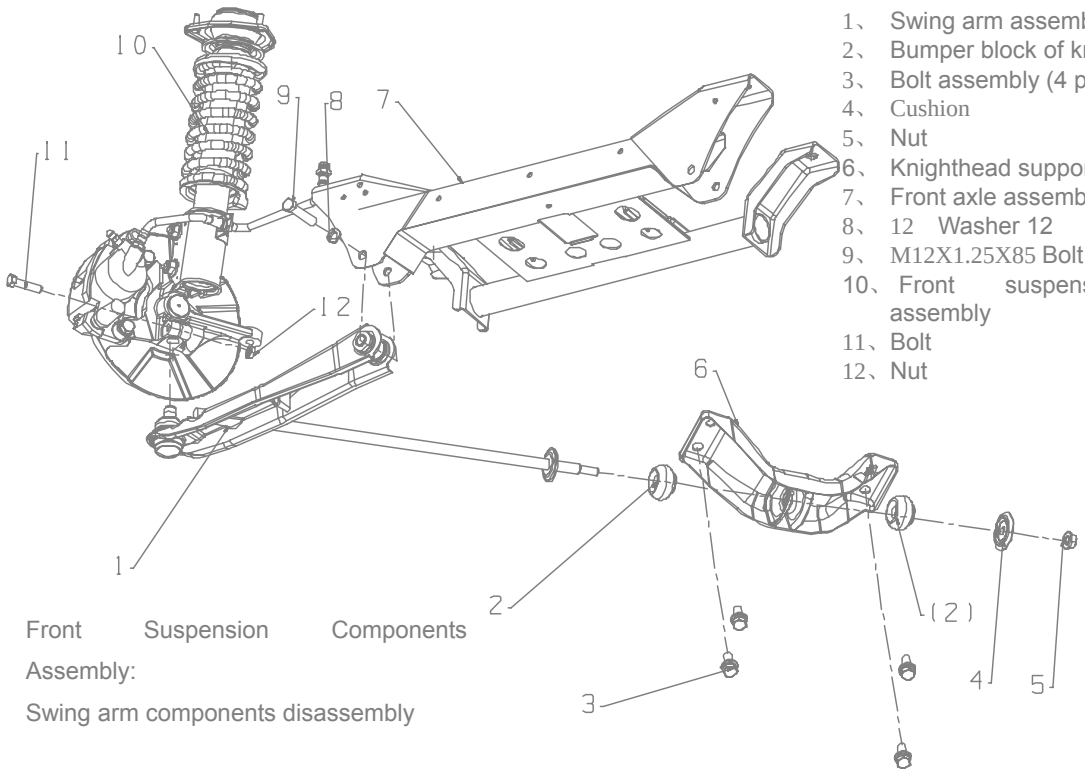
（a）Nut on the front suspension support assembly:
39.2～49N·m

（b）Nut on the connecting between the steering knuckle and front shock absorber: 85～95N·m

Both nut 1 and nut 2 are locknuts, do not use the locknut that has been disassembled and replace new one when re-assembling.



3.2.3.3 R/L Swing Arm Assembly



1、 Swing arm assembly
2、 Bumper block of knighthead
3、 Bolt assembly (4 pcs)
4、 Cushion
5、 Nut
6、 Knighthead support welded assembly
7、 Front axle assembly
8、 12 Washer 12
9、 M12X1.25X85 Bolt M12X1.25X85
10、 Front suspension components assembly
11、 Bolt
12、 Nut

Front Suspension Components Assembly:

Swing arm components disassembly

Disassembly

（1）Jack up the vehicle reliably.

（2）Take off the front wheel.

（3）Loosen off nut 5 on the connecting between swing arm assembly and knighthead bracket welded assembly, and take off the cushion 4 and front bumper block 2.

（4）loosen off bolt 11 and nut 12 on the connecting between swing arm and knuckle.

（5）loosen off bolt 9 and washer 8 on the connecting between swing arm and front axle assembly.

（6）Take off the swing arm and rear bumper block 2.

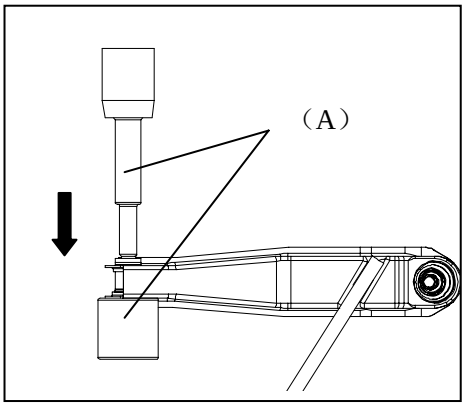
（7）Take off axle sleeve assembly of swing arm.

（8）loosen off bolt 3 (4 pcs) on the connecting between knighthead bracket welded assembly and frame.

（9）Take off knighthead bracket

Take off the axle sleeve assembly of swing arm with a special tool as shown in the figure.

Special Tool: （A）Dismounting device



Assembly

（1） assemble the axle sleeve assembly of swing arm by using a dismounting device.

Attention
Before assembling, coat the suds onto axle sleeve assembly of swing arm for lubrication.

Refer to the figure of "Front Suspension Components Assembly: Swing Arm Components Disassembly" when assembling:

（2）Assemble knighthead bracket welded assembly onto the front frame. Tightening torque value of bolt 3:

68.6-78.4 N·m.

（3）Assemble bumper block 2 onto the knighthead of swing arm assembly firstly; assemble another bumper block(2) and cushion 4 secondly; and tighten nut 5 slightly at last.

（4）Fasten swing arm assembly onto the front axle 7 with bolt 9 and washer 8. Bolt 9 is tightened slightly.

（5）Assemble the ball pin of swing arm assembly onto the knuckle to ensure that the ball pin groove is aligned to the bolt hole of knuckle. Install bolt 11 and nut 12 as shown in the figure, and adjust the torque of nut to the specified value.

Torque value: Nut on the connecting between ball

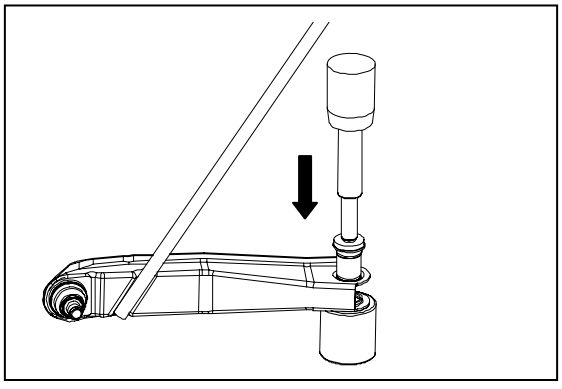
Tightening torque of pin of swing arm and knuckle is 55～65 N·m

（6）Tighten nut 5 with a tightening torque value of 68.6 - 88.3 N·m

Attention
.Both nut 5 and 12 are locknuts, do not use the locknut that has been disassembled and replace new one when re-assembling.

（7）Assemble the wheel.

（8）Remove the jack device, and weld swing arm and front axle under empty loaded conditionBolt on the connecting of assembly is tightened to a specified torque. Torque value: 78.4～98.1 N·m



3.3 Rear Suspension

3.3.1 Specifications

Suspension mode: Longitudinally mounted symmetry type semiellipse leaf spring with telescopic shock absorber

Number of leaves on leaf spring: 4 main spring and 1 auxiliary spring

Stiffness in installation status:

Main spring Stiffness: 42.67N/mm

Combined stiffness of main and auxiliary spring: 86.73N/mm

Flattening length of spring: 1000mm

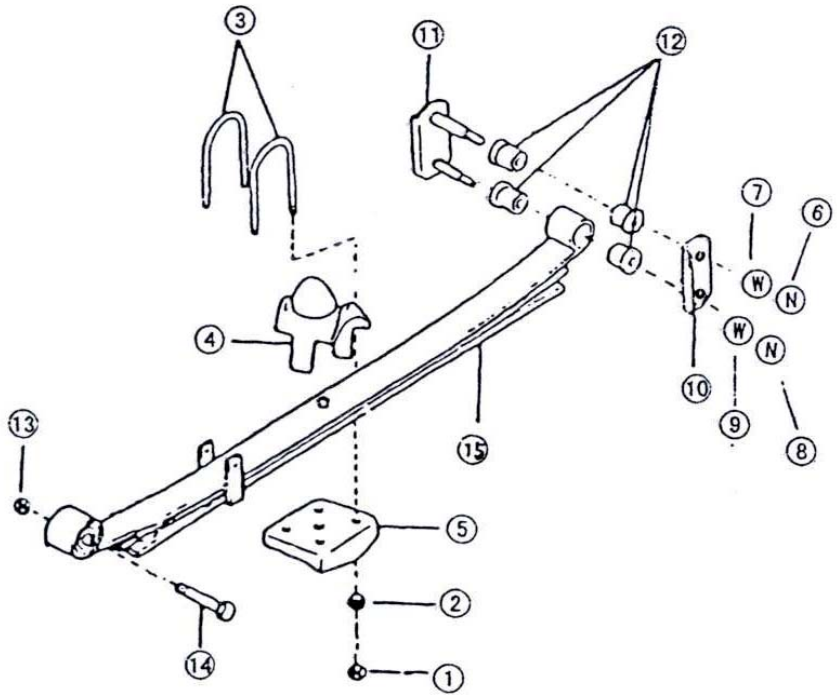
Spring lamination width: 60mm

Height of arc in installation status (idle load): 135mm

3.3.2 Rear Suspension Assembly Drawing

Disassembly

Disassemble according to the sequence shown in the following figure.



① Nut M10×1.25-10 ② Grower washer 10 ③ U bolt ④ Buffer rubber assembly

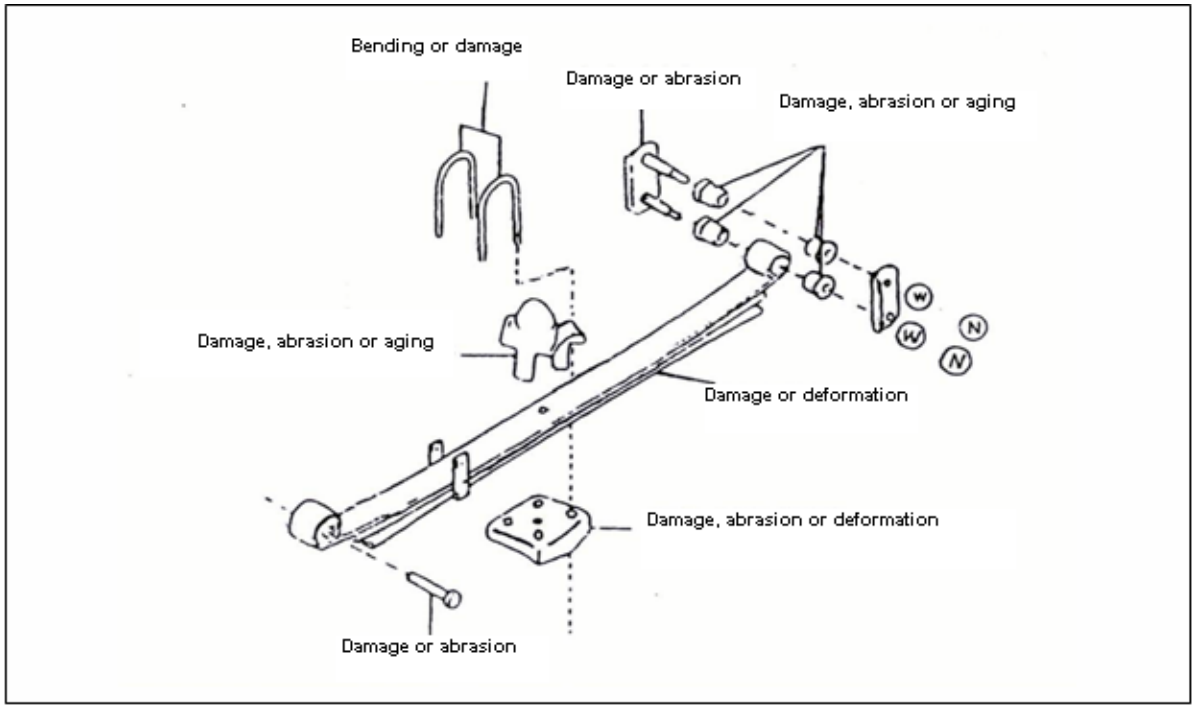
⑤ Shock absorber bottom bracket welded assembly ⑥ Nut M10×1.25-10

⑦ Grower washer 10 ⑧ Nut M10×1.25-10 ⑨ Grower washer 10 ⑩ Shackle plate II

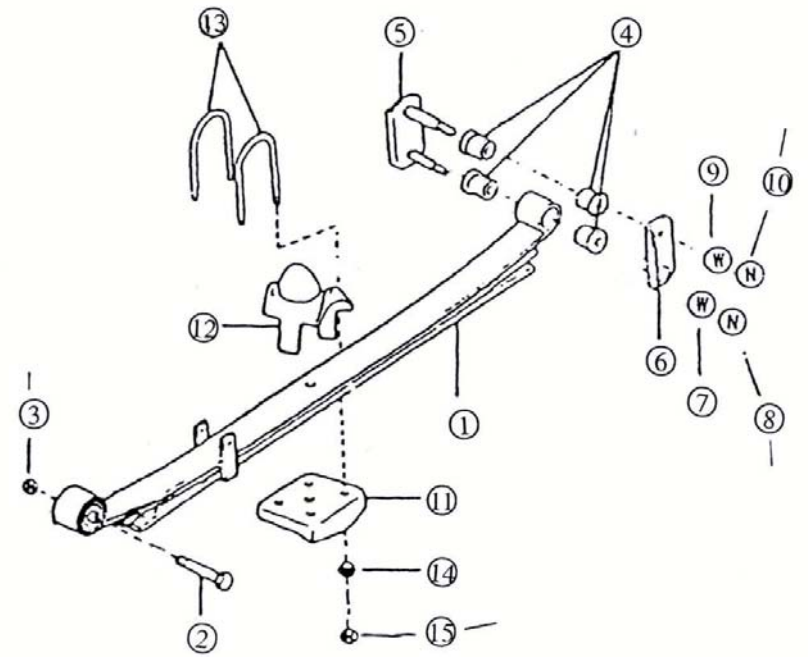
⑪ Plate spring shackle assembly ⑫ Plate spring bushing (II) ⑬ Lock nut M12×1.25-8

⑭ Front Holding pin of plate spring ⑮ Plate spring with bushing assembly

Checking Check the undermentioned parts.



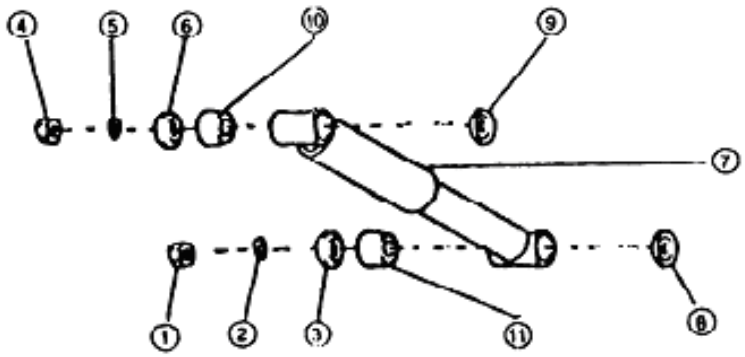
Assembly Install the parts according to the sequence shown in the figure.



① Plate spring with bushing assembly	② Front holding pin of plate spring	③ Lock nut M12×1.25-8	④ Plate spring bushing (II)	⑤ Plate spring shackle assembly
⑥ Shackle plate II	⑦ Grower washer 10	⑧ Nut M10×1.25-10	⑨ Grower washer 10	⑩ Nut M10×1.25-10
⑪ Shock absorber bottom bracket welded assembly	⑫ Buffer rubber assembly	⑬ U bolt	⑭ Grower washer 10	⑮ Nut M10×1.25-10

3.3.3 Rear Shock Absorber Assembly

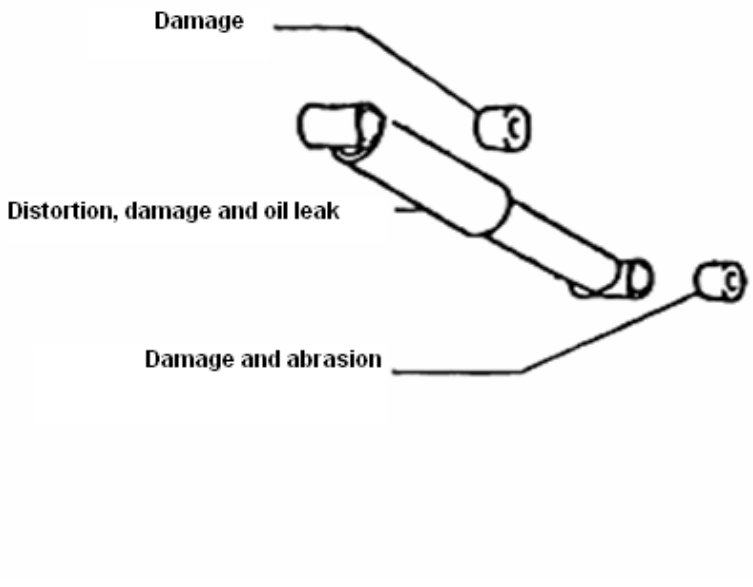
3.3.3.1 Disassembly



① Hex nut
② Grower washer
③ Outer bearing pad
④ Hex nut
⑤ Grower washer
⑥ Outer bearing pad
⑦ Shock absorber
⑧ Inner bearing pad
⑨ Inner bearing pad
⑩ Rear shock absorber bushing
⑪ Rear shock absorber bushing

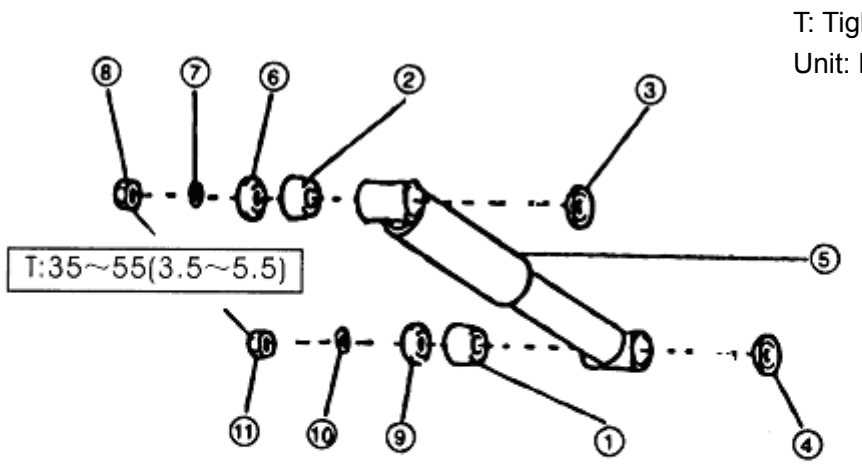
Disassembly Disassemble the parts according to the sequence shown in the figure.

Checking Check the parts.



3.3.3.3 Assembly

Install the parts according to the sequence shown in the figure.



① Rear shock absorber bushing
② Rear shock absorber bushing
③ Inner bearing pad
④ Inner bearing pad
⑤ Shock absorber
⑥ Outer bearing pad
⑦ Grower washer
⑧ Hex nut
⑨ Outer bearing pad
⑩ Grower washer
⑪ Hex nut

3.3.4 Notices to the Maintenance of Rear Suspension

· Check the rubber parts, always replace them if any damage, crack and aging.

· Check the parts such as back plate and Front pin assembly, shackle inner lateral plate welded assembly, shackle outer lateral plate, left/right plate spring plywood assembly, U bolts, etc. and threaded fasteners. Always replace them at once if any damage such as abrasion, crack or screw thread failure.

· Check the rear shock absorber assembly, always replace it if any oil leak, abnormal knocking, failure and seizure.

·Check the plate spring assembly and replace its spring lamination at once if there are cracks in it. Also, always replace the clamp and U clamp if any damage.

· When installing, apply graphite lithium base grease between each leaf of plate spring.

· When installing, class symbols of two plate spring assemblies in the same vehicle should be not different.

3.4 Wheel and Tire

3.4.1 Specifications

Wheel type： Disc wheel

Wheel rim specifications：

13×5J（or 13×5.00B）

Wheel offset distance： 50

Tire Type： 175R13LT

Inflation pressure of tire(Kpa):

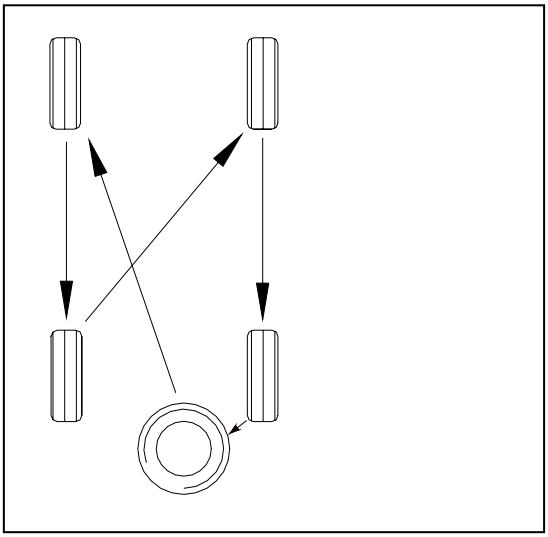
	Empty loaded	Fully loaded
Front wheel tire	200	200
Rear wheel tire	200	200

3.4.2 Wheel Assembly

1. 175R13LT Wheel Assembly
2. Wheel
3. Tire valve cock Z2-01-3
4. Balancing Block
5. Decorative Cover

3.4.3 Wheel Transposition

Transpose the wheels' position per 10 thousand kilometers as shown in the figure, so that make tires' abrasion uniform.



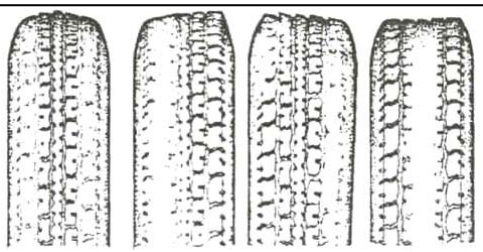
3.4.4 Maintenance Guide

3.4.4.1 Irregular or Earlier Abrasion of Tire

There are many reasons for the happening of irregular abrasion and earlier abrasion, such as: improper inflation pressure, no tire transposition, bad driving habit and location improper.

If there is something else happen as follow, the tire must be transposed.

1) Abrasion difference between front and rear tires.
2) Leaning abrasion of tire
3) Abrasion difference between front R&L tires.
4) Abrasion difference between rear R&L tires.
If there are something else happen as follow, the wheel alignment should be checked.
1) Abrasion difference between front R&L tires.
2) Serious leaning abrasion of tire
3) Feather abrasion on one side of the tread pattern rib or pattern block.

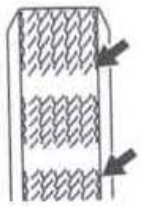


1 2 3 4

1.Difficulty in steering /underinflated
2. Improper alignment/lack of transposition
3. Improper alignment/tires are not uniform
4. Start by jerk/tire pressure is too high

3.4.4.2 Limitation of the Tire Abrasion

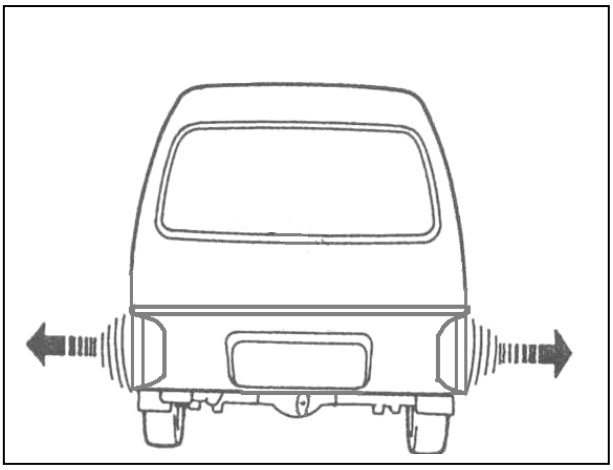
The tire must be replaced when the depth of tread pattern groove ≤1.6mm (0.063in), or there are six indicating patterns on one direction of the tire tread, and more than three of them are coming up to the groove.



Limitation: 1.6mm

3.4.4.3 Lateral Sway of the Tire

Swing means there is a shimmy happens to the vehicle of the front part and rear part, which result from the steel wire belted layer in tires out of straight. This swing appears obviously when vehicle running at a low speed about 8-48km/h（5-30mile/h）
Just carry through road running test to the vehicle to ascertain the trouble tire.
If the problem happens to the rear wheel, the driver may have a feeling that someone is pushing on the side of the car when it swings bilaterally.
If the problem happens to the front wheel, the driver may have a more obvious feeling of swing of the wheel bearing that the metal plate parts move forward and backward. 1) Find out which part causes the swing problem, wheel of front or rear.
2) If the swing side cannot be found after fitting good tire and wheel onto the vehicle, replace the wheel of rear.
3) Process a road running test again. If the swing problem gets weak, fit a used tire onto the vehicle until the problematic one has been found out. If the swing problem gets worse, replace 4 used tires with new ones, and then install one used tire again according to the same method to check the trouble in turn.



3.4.4.4 Running Deviation and Diagnoses Flow

"Running Deviation" means even though there isn't any force acting on the vehicle; it may also runs out of the straight line on the plane road surface.

The reasons for running deviation:

·Improper front wheel alignment

·Running with applying the brake

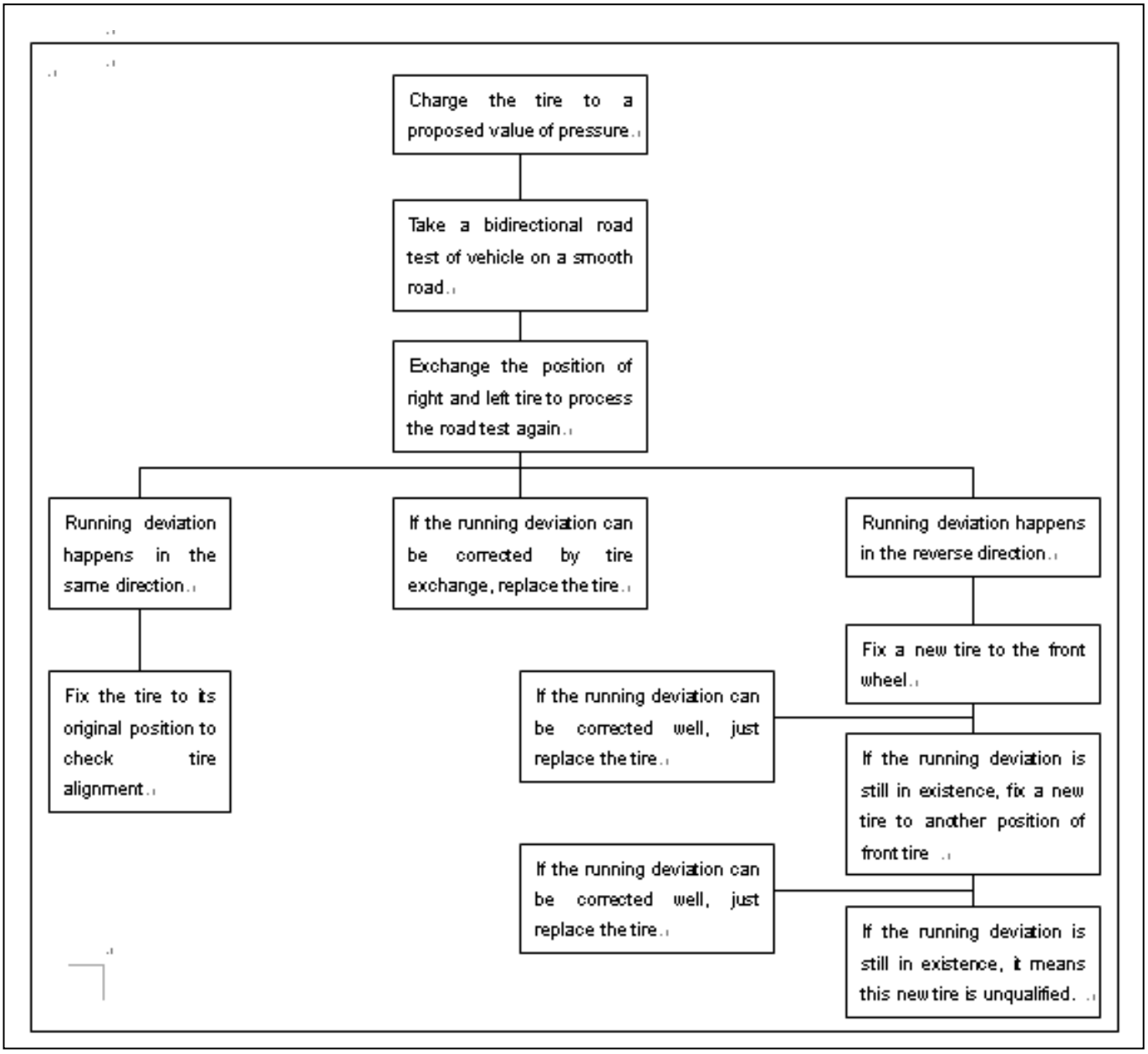
·Tire defects

The way of manufacturing may cause the direction deviation of the vehicle. Take the tire fixed by belted layer as an example. Off-centering belt layer may cause a lateral force to the vehicle that make the vehicle sway on the road. If the diameter on one side of tire is longer than that of the other one, the tire may be easy to swing on one side, which may enhance the lateral force to cause deviation running of the vehicle. In case of this, adopt the following processes in the sheet (Diagnoses Flow Chart of Running Deviation) to ensure the accuracy of front wheel alignment so as to avoid the direction deviation of the vehicle.

1) There are some differences between accurate tire transposition figure in *User Manual and Maintenance Guide* and the parts of running deviation diagnoses process. If one kind of middle or high mileage tire is fixed to one side of the vehicle, it must be checked whether it is comfortable or not on driving.

2) Rear tire cannot result in the direction deviation of the vehicle.

Diagnoses Flow Chart of Running Deviation

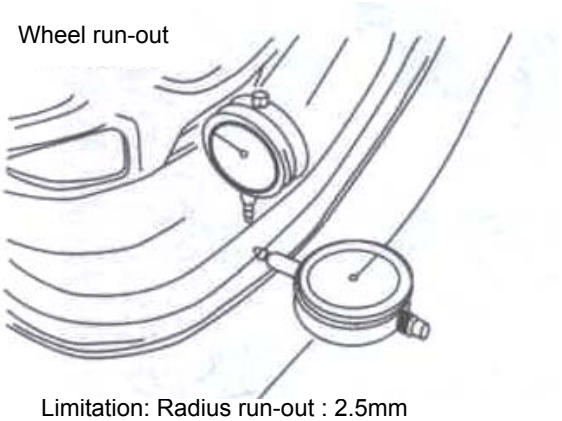

Charge the tire to a proposed value of pressure.
Take a bidirectional road test of vehicle on a smooth road.
Exchange the position of right and left tire to process the road test again.
Running deviation happens in the same direction.
If the running deviation can be corrected by tire exchange, replace the tire.
Running deviation happens in the reverse direction.
Fix the tire to its original position to check tire alignment.
Fix a new tire to the front wheel.
If the running deviation can be corrected well, just replace the tire.
If the running deviation is still in existence, fix a new tire to another position of front tire.
If the running deviation can be corrected well, just replace the tire.
If the running deviation is still in existence, it means this new tire is unqualified.

3.4.4.5 Tire Swing (radial run-out)

That most of the vehicle swing happens on high-way driving is due to the imbalance of wheel. If the dynamic element has come to balance, the swing is still exists, the possible reason may be:
Tire run-out.
Wheel run-out
Stiffness of tire gets change.

Wheel run-out must not exceed the limitation as shown in the figure.

Wheel run-out

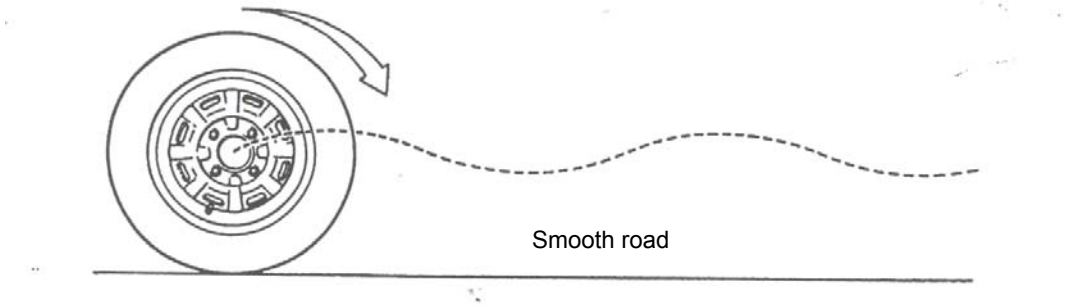


Limitation: Radius run-out : 2.5mm
Lateral run-out: 2.5mm

Important notice: wheel run-out should be measured again and carried out a balance test after replacement.

Only some parts of the concerns can be showed per free run-out value of tire/wheel measure. It is necessary to find out the three reasons that cause vehicle swing per tire problem check device (TPD), such as run-out when loaded. If tire problem check device can not be available, just replace with good tire assembly, but that may waste so much time to finish it.

Suspension move (run-out when loaded)



Reasons

Tire out of round | Poor wheel stiffness | Rim bend or out of round

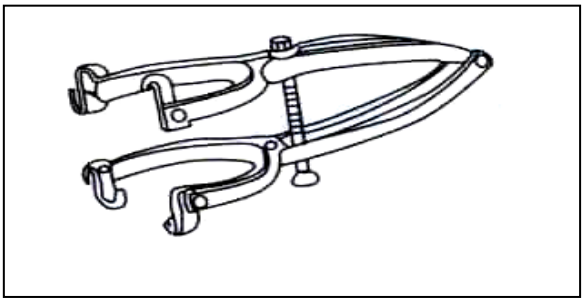
3.5 Failure Diagnosis

3.5.1 Check Table of Breakdown Maintenance

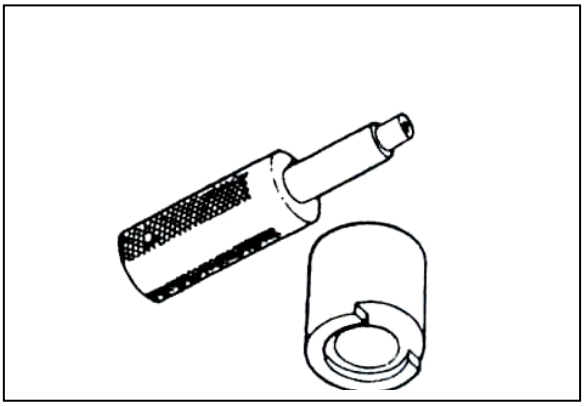
Troubles	Reasons	Methods
Running deviation of the tire	● Tires are not matching.	● Replacement
	● Improper tire pressure	● Adjust the tire pressure to the specified value.
	● Spring broken or shorten due to plastic deformation	● Replace the spring.
	● The uniformity (change of lateral stiffness)of radial tire exceeds its limitation	● Replace the tire.
	One tire moves with braking.	● Repair the brake.
	● The suspension components of front or rear get loosing, bending and broken.	● Fasten or replace the suspension components
Abnormal Abrasion of the tire	● Spring broken or shorten due to plastic deformation.	● Replacement
	● Tires' imbalance exceeds their limitation.	● Adjustment
	● Slip value of tire exceeds the tolerance limit.	● Check and adjust the toe-in.
	● Front shock absorber failure	● Replacement
	● Overload of the vehicle	
	● No transposition of the tire	● Transposition
	● Wheel bearing is so over abraded that becomes loosing.	● Replacement
	● Insufficient or over high tire pressure	● Adjust the tire pressure to the specified value.
	● Wheel wobble (lateral or radial)	● Replacement
	● Wheel bearing has been abraded.	● Replace the wheel bearing
	● Spring broken or shorten due to plastic deformation.	● Replace front coil spring
	● Insufficient tire inflation	● Inflate the tire to a required pressure
	● Spring broken or shorten due to plastic deformation.	● Replace the spring.
	● Wheel overloaded or the load on R&L sides are not in balance.	● Check the load.
	● R&L springs are not in a group.	● Replace the spring.
	● Overloaded or load of one side is over burdened.	● Check the load.
	● Spring holder of front shock absorber is welded unstably.	● Replace the front shock absorber.
	● Spring broken or shorten due to plastic deformation.	● Replace the spring.
	● Lateral stabilizer bar gets loosing.	● Fasten the bolt and nut of stabilizer bar, or replace the bushing or joint.
	● Spring broken or shorten due to plastic deformation.	● Replace the spring.
	● Overload	● Check the load.
	● Turning speed is too fast.	● Decrease the turning speed.

3.5.2 Special Tools

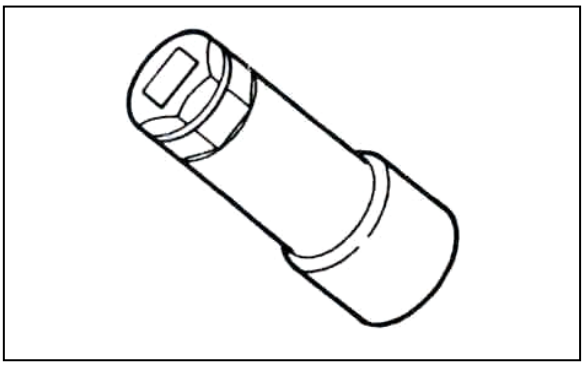
Spring Compressor



Replacer of Swing arm Axle Sleeve Assembly



Deep Socket Wrench



Chapter 4 Power Train

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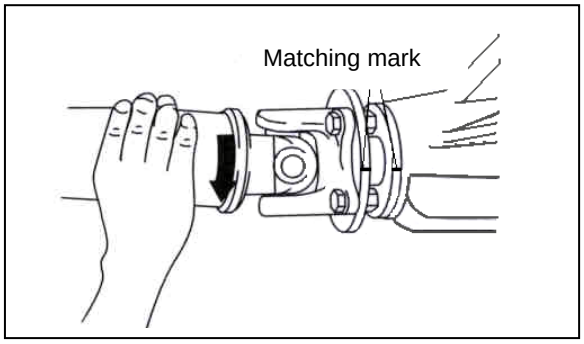
4.1 Check and Adjustment of Power Train

4.1.1 Check for Rotational Noise

·If there is a noise when drive in a high speed or the whole vehicle gives a feeling of swinging, in general, that means the dynamic balance of the propeller shaft assembly exceeds its specified value or has been bent and deformed. In that case, it must be adjusted by a professional workshop and proceed with a dynamic balance adjustment as well, or just replaced.

·If the noise occurs when drive in a low speed or speed change, in general, that probably because of part gets loosing due to abrasion. Replace the whole drive shaft when sliding yoke splines, cross axle and needle bearing is abraded badly.

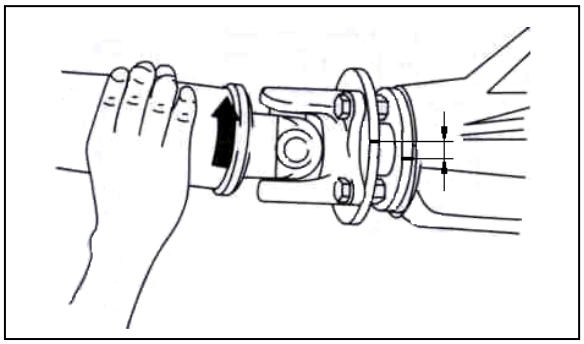


4.1.2 Check for Abnormal Noise of Rear Axle

This noise may happen when the drive gear wheel and driven gear of speed reducer are broken, or the mesh mark can not meet the requirements due to serious abrasion of gears and bearings, or bearings are abraded seriously and are damaged. If the noise occurs on driving, stop the car, check and carry out trouble clearing.

① Push the gear shift lever of gearbox to the neutral position, pull up the parking brake handle.

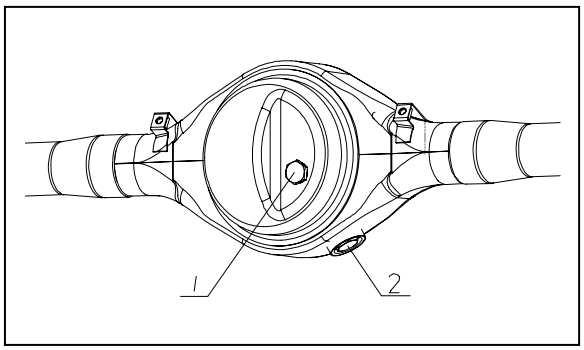
② Rotate the drive shaft to the end with a clockwise direction, mark with a matching mark.



③Rotate the drive shaft to the end with an anticlockwise direction, measure the distance between the matching marks, which is the total end play of rear axle of power train. Its ultimate value is 5 mm.

④If the end play exceeds the ultimate value, remove the speed reducer assembly and adjust it.

4.1.3 Check for calorification of Outer Housing of Rear Axle and Speed Reducer



The reasons may concern to the over pre-tightening of bearing, or engagement side play of the gear is too small, or insufficient lubrication oil and wrong specifications of lubrication oil. Once the problems above occur, remove the trouble in time.

Often clean the vent-plug, keep the air vent clear.

4.1.4 Check and Replacement for Lubrication Oil of

Speed Reducer

·Position:

1----Oil inlet hole, Torque of plug screw 40~60 N·m

2----Oil drain hole, Torque of plug screw 40~60 N·m

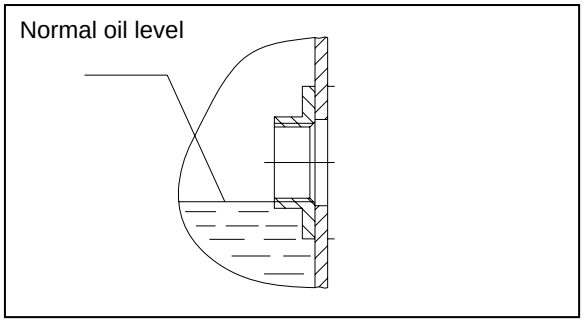
· Oil level check-up:

① Stop the car on the level ground, and tension grip brake.

② Remove the plug screw of oil inlet hole.

③ Stretch the finger into the filler inlet to touch the oil level.

④ Fit on the plug screw of oil inlet hole.



Warning

After driving the vehicle, its oil temperature is extremely high, check the oil lever only after decreasing the temperature until the oil outlet plug no longer burn you hand.

Specifications of the lubrication oil as following:

Specifications	Volume
GL-5 90 (used in summer in the north and south of China); GL-5 80W/90 (used in winter in the north and south of China with a condition of -35℃ or -35℃ below)	1.2L

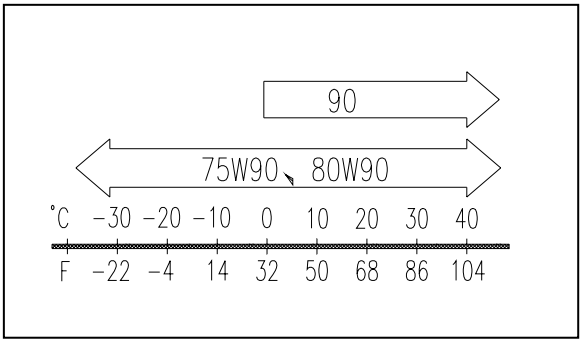
·Replacement of lubrication oil:

① Remove the plug screw of oil inlet hole.

② Remove the plug screw of oil drain hole . After draining all the oil, fit on the plug screw of oil drain hole and tighten it according to specified torque.

③ Fill with a kind of gear lubricant oil that fits to the season need on viscosity and brand from the filler inlet to its bottom.

④Fit on the plug screw of oil inlet hole，tighten it according to specified torque.



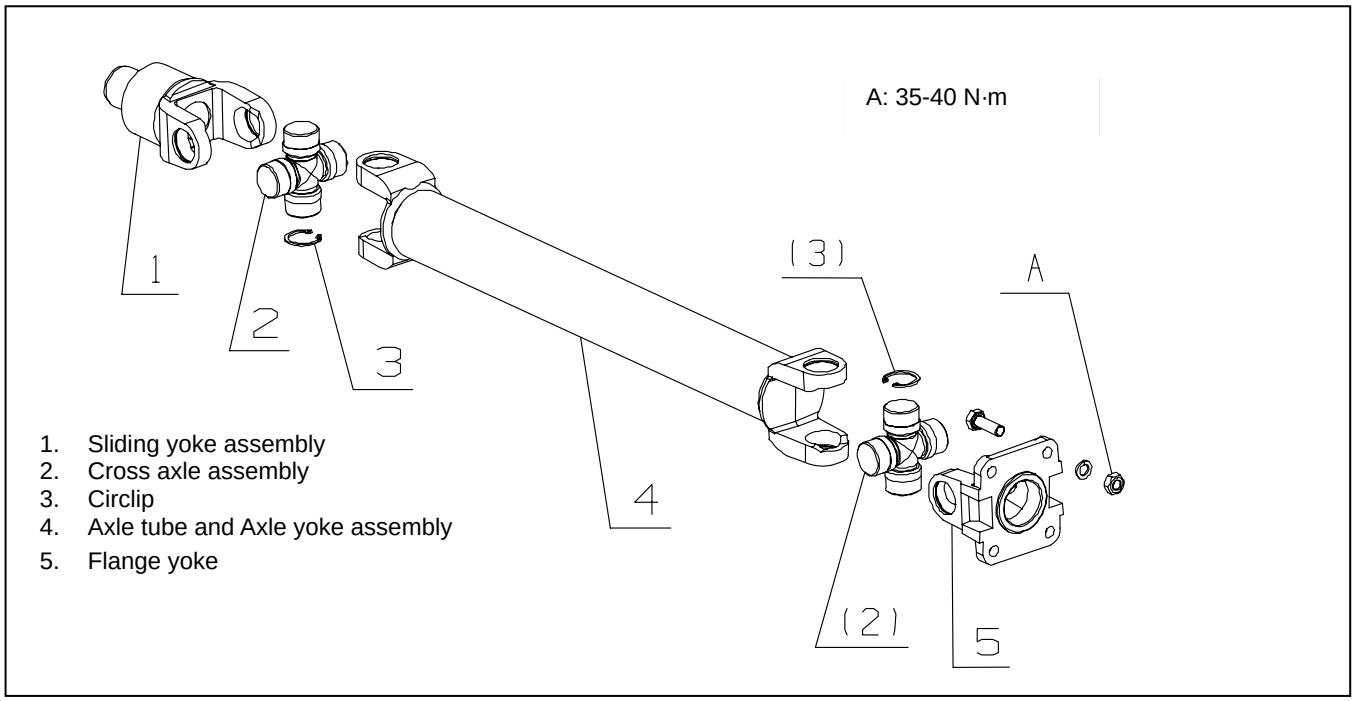
4.2 Drive Shaft

4.2.1 Specifications

The drive shaft adopts a double universal joint structure, which the front end connects with sliding spline, and the back end connects with flange bolt.

Size of universal joint: (Shape size) D×L=24.017×63.99

4.2.2 Drive Shaft Assembly



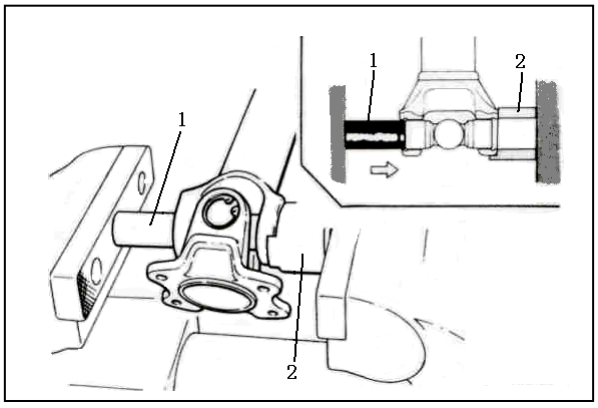
4.2.3 Maintenance Guide

(1)Remove the snap ring with a circlip pliers.

(2) Use a special tool to pull out the bearing pedestal ring of cross axle from the pedestal ring of the Axle yoke with 3-4mm in length.

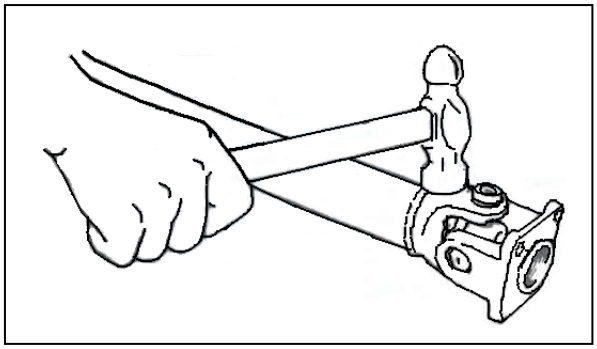
Special Tools:

1. Guide Pillar
2. Seating



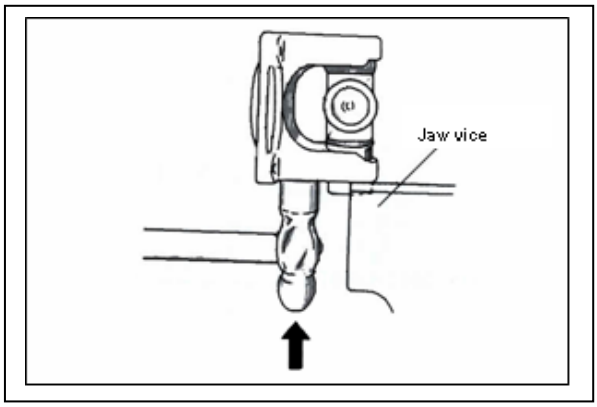
Attention

Before pulling out the bearing pedestal rings of cross axle, osmotic lubrication should be applied between the bearing pedestal rings and the pedestal rings of the axle yoke.



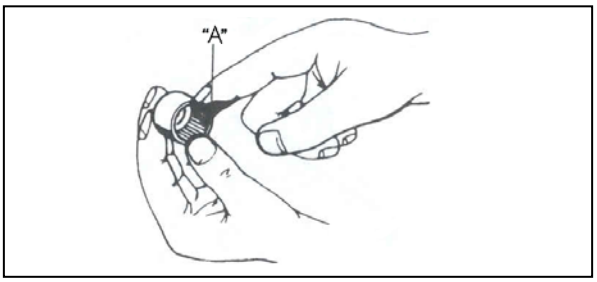
(3) Knock the tube yoke with a hammer to remove the bearing pedestal rings.

(4) Take off the bearing pedestal ring on the other side according to the methods in the process of (2) and (3).



(5) Flange yoke disassembly. Pull out the bearing pedestal ring of the flange yoke according to the methods in the process of (1) and (2). Then clip the bearing pedestal ring by a jaw vice while knock the flange yoke to take off the pedestal ring. Use the same way to remove the bearing pedestal ring on the other side.

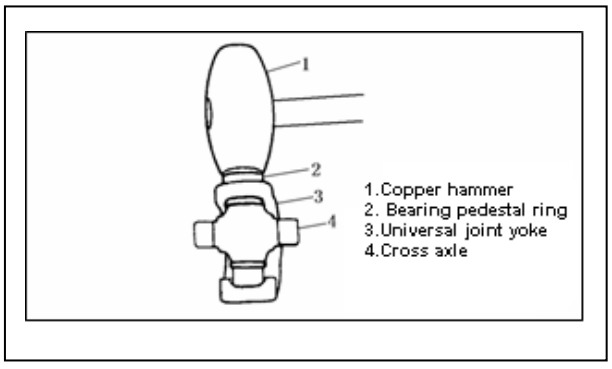
(6) Disassembly of sliding yoke. Disassemble the sliding yoke according to the methods in the process of



Assembly

Attention

Make sure all of the roller pins in bearing pedestal ring of cross axle have been located accurately. Lubrication oil must be applied on the bearing pedestal rings of cross axle.



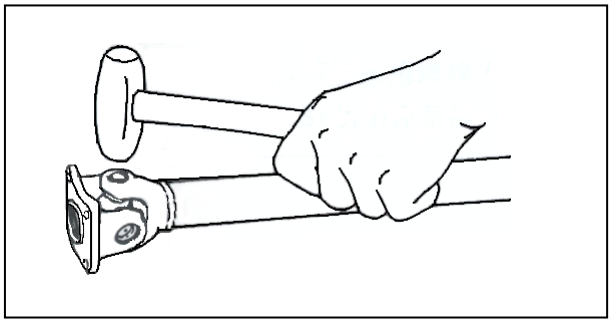
"A"：Lubrication. 7022 high performance vehicle lubrication or lithium-base lubrication can be adopted for this lubricating.

Attention

When reassembly, snap ring, cross axle and bearing must be used new ones, No reuse of the snap ring, cross axle and bearing once they have been disassembled.

(1) Insert the bearing pedestal rings to the inner of tube yoke of drive shaft, and knock it with a hammer until it flushes to the yoke surface. At the same time, insert the cross axle to the inside of bearing pedestal rings to avoid roller pins dropping out of the bearing pedestal rings.

(2) Insert the bearing pedestal ring on the other side to the inner of tube yoke, and knock it with a hammer until it flushes to the inner side face of Jump ring groove in tube yoke.



(3) Insert the bearing pedestal rings to the inner of flange yoke as per the methods in the process of (1) and (2).

Attention

Put a plate onto the bearing seat ring so as to avoid breaking the universal joint of axle yoke when insert the bearing seat ring.

(4) Fix a proper thick snap ring onto the yoke hole of the axle yoke and the flange yoke (clearance is 0-0.06 mm).

(5) Fit the sliding yoke on the axle yoke of drive shaft with the above-mentioned same method.

Assembly

Assemble the drive shaft as per a reverse order of disassembly.

Tightening torque value for connecting Flange yoke as following: Tightening Torque: 35-40 N·m

Attention

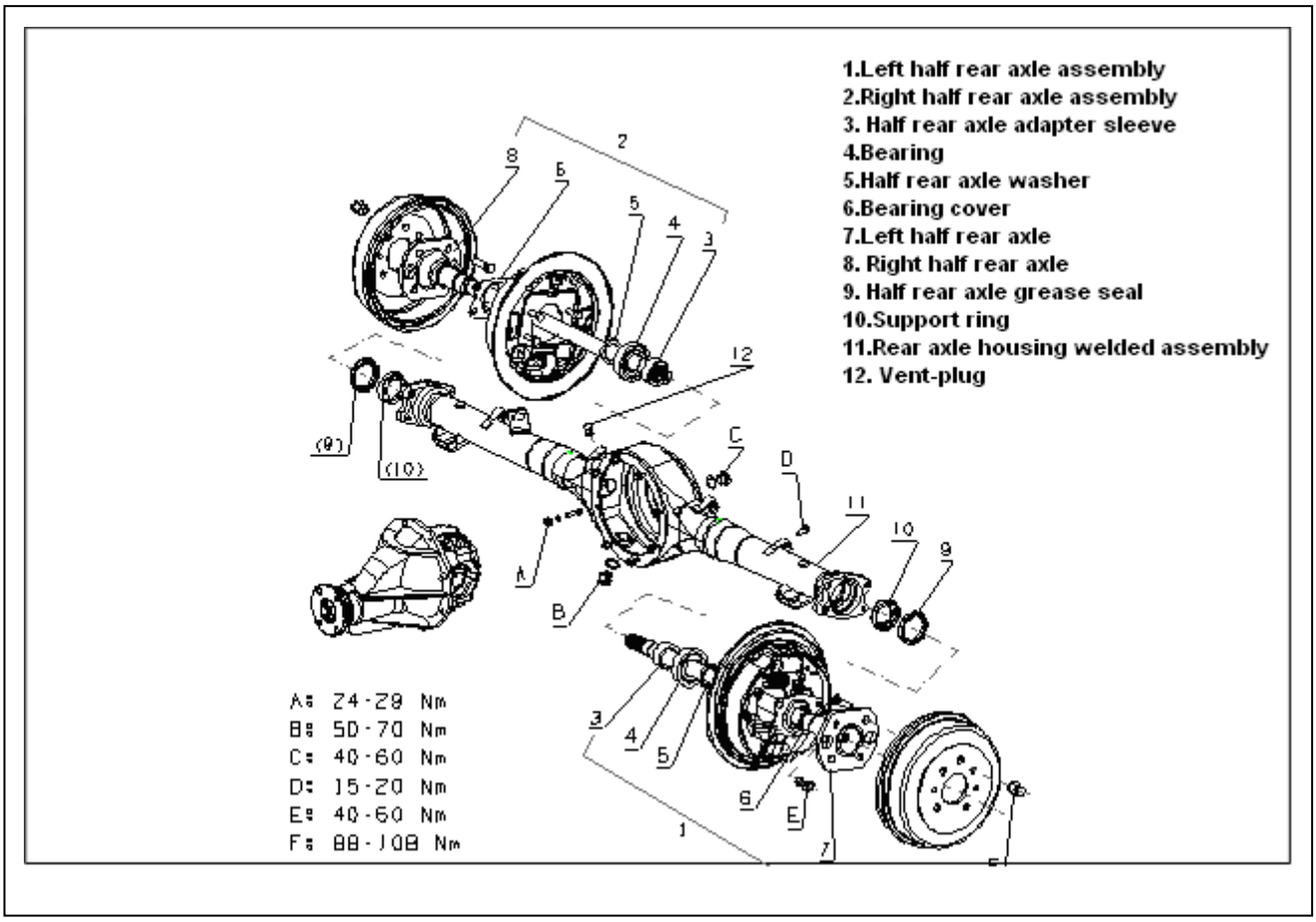
The connecting flange yoke should be aligned with the matching marks when it is fixed on the rear axle. Otherwise, it can result in vibration when running.

4.3 Rear Axle

4.3.1 Specifications

Type of rear axle housing：Integral press-welding type
Supporting mode of half rear axle: semi-floating type
Size of half rear axle: (internal dia.× external dia.×width mm):3207A-2RS（35×72×27）
Speed reducer
Type of gear: hypoid gear (Gleason tooth)
Reduction ratio：41/8=5.125
Type of front axle: (internal dia.×external dia.×width mm):30305X2B（25×62×18.25）
Type of rear axle: (internal dia.×external dia.×width mm):30306X2B（30×72×24.35）
Differential mechanism
Half rear axle gear type (quantity × teeth number): Bevel gear of straight teeth（2×14）
Planetary gear type (quantity × teeth number): Bevel gear of straight teeth（2×10）
Bearing type (internal dia.×external dia.×width mm): 32008X1WC（40×72×19）

4.3.2 Half Rear Axle and Rear Axle Housing Assembly



4.3.3 Maintenance Guide

Disassembly

·Disassemble the rear axle

(1) Jack up the vehicle body safely and reliably and remove the wheels.

(2) Use a bracket to Jack up the rear axle.

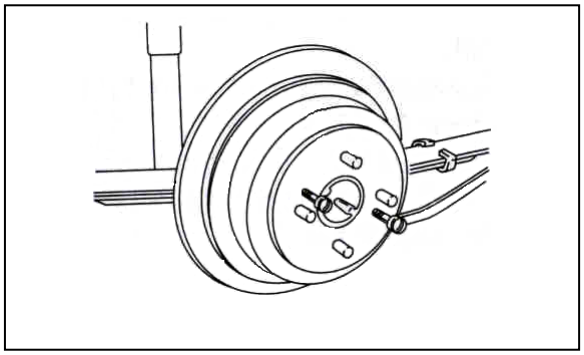
(3) Remove the parking brake cable. Let out the brake fluid and dismantle the brake hose, spring screw of loading sensing pressure proportioning valve and bolts of drive shaft.

(4) Remove the lower extreme connection of rear shock absorber.

(5) loosen and draw out the connecting pin with lifting eye that used for leaf spring installing.

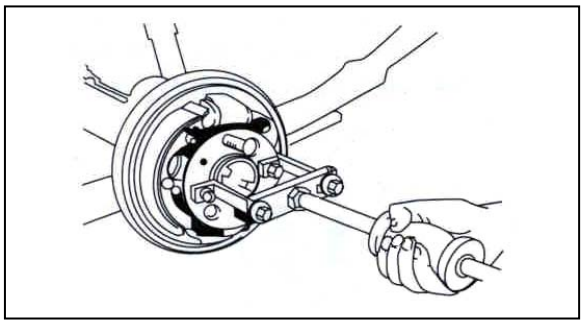
(6) Lower the bracket so as to separate the rear axle and vehicle body.

·Disassemble brake drum. If it is hard to disassemble the brake drum, screw a bolt（M8×1.25）into the spare bolt hole to push out the brake drum.



·Remove the tightening bolt of brake.

·Pull out the half rear axle assembly. If it is hard to do that, use a special tool of sliding hammer.



Check before half rear axle assembly disassembly

·Check the half rear axle, if bending happens to half rear axle, proceed a cold pressing by a press machine to adjust it. Its ultimate value allowance of the flexural

modulus is not more than 0.8mm.

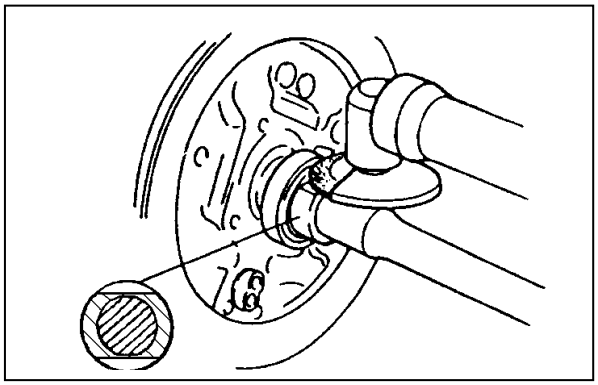
·Check that the half rear axle splines are serious abrasion or cracks or the cracks occur on other places, just replace them.

·Check the installation site of oil seal on the adapter sleeve external diameter, if it appears a obvious groove or serious abrasion that may affect the performance of seal. If so, replace the adapter sleeve and oil seal.

·Replace the rear axle housing if it gets bending, deformed and broken after checking.

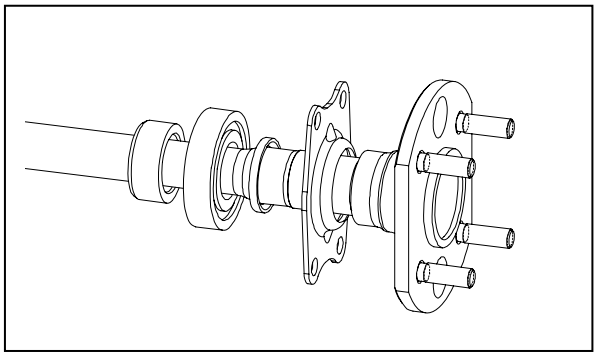
Half rear axle assembly disassembly

·Use a grinder to polish the adapter sleeve of bearing to a thickness of 1-1.5mm, and cut it down by a chisel.

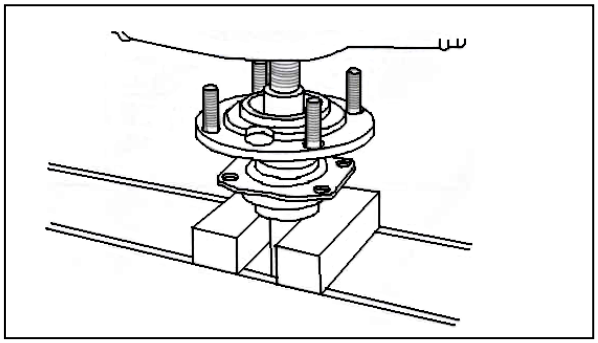


· Pull out the bearing with a special tool.

· Install the bearing cover, half rear axle gaskets, bearings and adapter sleeve in the half rear axle as shown in the figure.

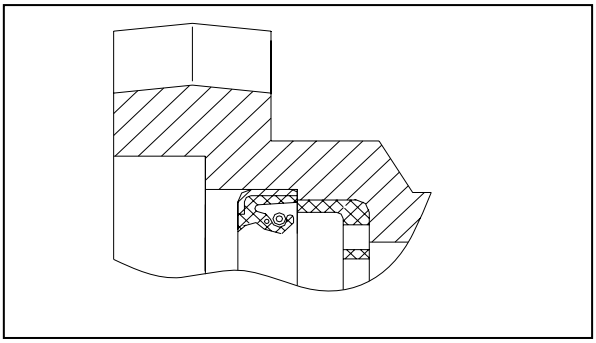


·Use a press machine with a initial pressure 29 kN or 29 kN above and a final pressure 58 kN or 58 kN above to press the adapter sleeve to meet the bearing. Make sure the bearing has been pressed to the right position and met the bearing tightly around the edge of the adapter sleeve.



·Replace the removed and used oil seal of half rear

axle in the inner of rear axle housing with a new one. Apply appropriate amount of high performance lithium-base lubrication on the mouth and the inner of groove of the oil seal. The oil seal mouth should face inwards.

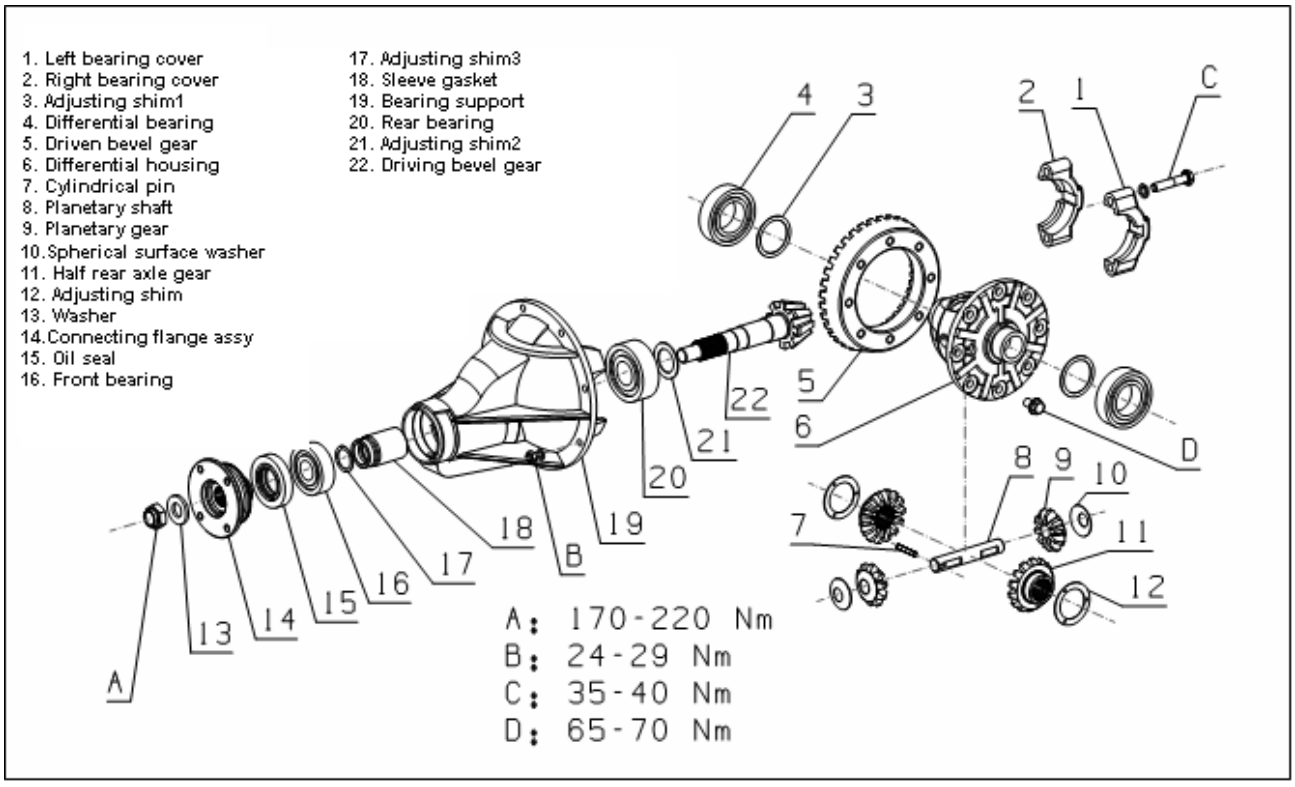


·Apply semi-dry seal gum on the end face of axle tube of half rear axle for rear axle housing and the contact face of brake base plate. After installing the half rear axle assembly in the rear axle housing, gradually fasten the nuts of set bolts for bearing cover up to the specified torque according to a diagonal order by divided into several times. (Tightening Torque: 40-60 N·m)

·Install the braking oil pipe connection of brake.

·If the rear axle has been disassembled, assemble it as per the reverse order of disassembly.

4.3.4 Speed Reducer Assembly



4.3.5 Maintenance Guide

Disassembly

① Let out the gear oil from rear axle assembly.

② Remove the drive shaft from the position used to connect the flange.

③ Pull out the half rear axle of right side and left side about 70mm as per the methods of half rear axle disassembly.

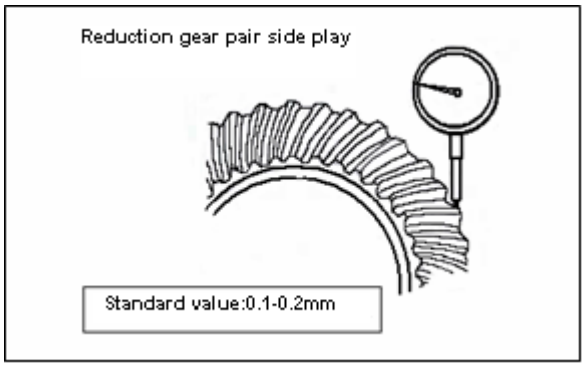
④ Remove the reducer from rear axle housing.

Check before disassembly

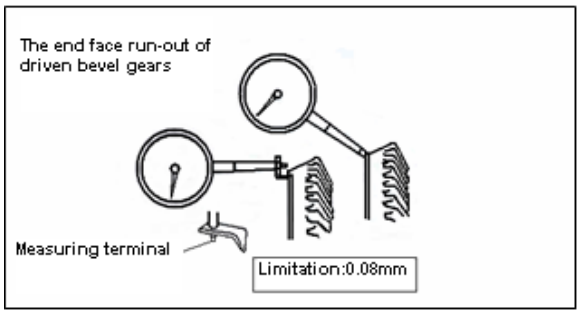
· Check that every gear have defects of gear broken, cracks, surface flaking off and serious deep pockmarks, etc., were this to happen, replace them. The driving bevel gear and driven bevel gear should be replaced in pairs.

·Check the bearing and bearing hole that used to install bearing. Replace them if they are damaged or abraded seriously.

· Check on reduction gear pair side play. Make the contact of dial indicator contact the proper position of the convex surface of driven bevel gear big end. Fix the driving bevel gear, and then make a reciprocating rotation on driven bevel gear to measure the gear pair side play.

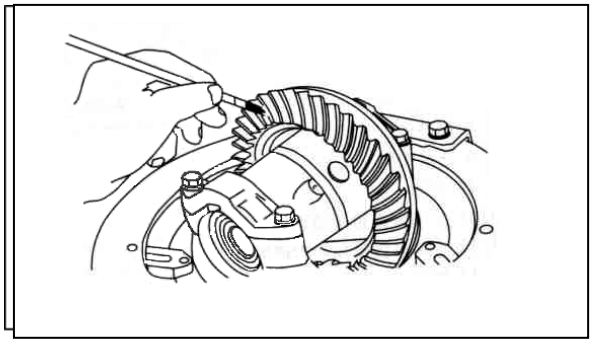


· Check on the end surface run-out of driven bevel gear. Lay the contact of dial indicator on the back of driven bevel gear, and rotate the gear to measure the run-out around the whole gear.



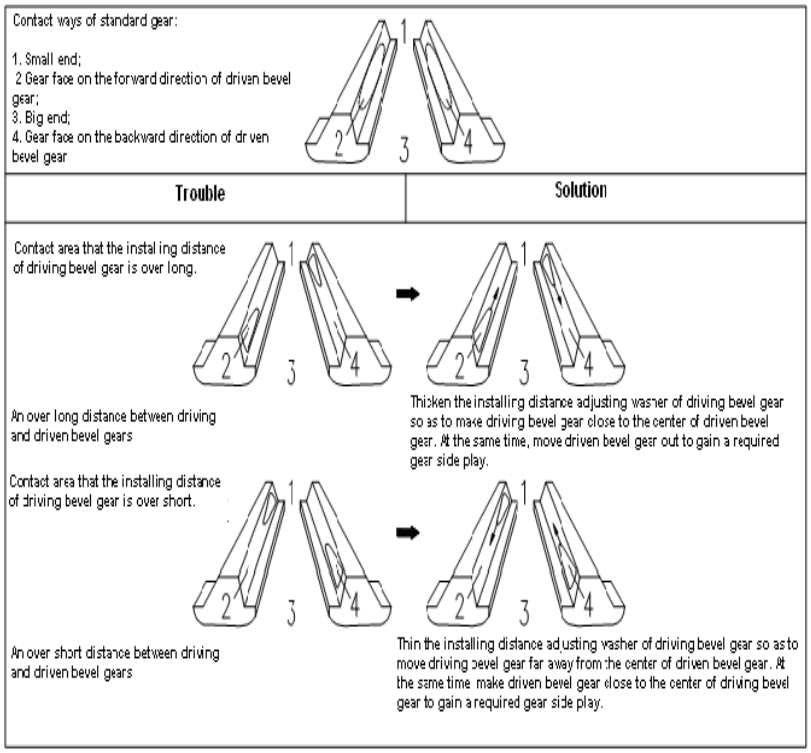
· Check on the side play of differential gear pair. A wooden chock is wedged between one planetary gear and one half rear axle gear so as to fix the gear pair not to rotate. Put the contact of dial indicator onto the middle part of teeth of the other planetary gear; rotate the planetary gear to and fro for measuring the gear side play.

·Check on the contact area of reduction gear pair.



Apply a thin layer of red lead on the front and back side face of the driven bevel gear teeth with a quantity of ten teeth. Inset a copper stick into the space between the bearing support and the differential housing. Rotate the connecting flange in forward and reverse direction while apply a load by a copper stick, so that the rotation of connecting flange needs a driving moment of 2.5-3mm. Check the contact area of gear face, which is an important quality index of reduction gear pair and a method to verify whether the installation distance of driving bevel gear and the gear pair side play are proper or not. A qualified contact area can be achieved by adjusting installation distance and side play. If adjustment is failure to get a qualified contact area that means the gear pair has be abraded so seriously that needs to be replaced.

Check and Adjustment of Engagement States Regarding the Gear Face of Driving Gear and Driven Gear

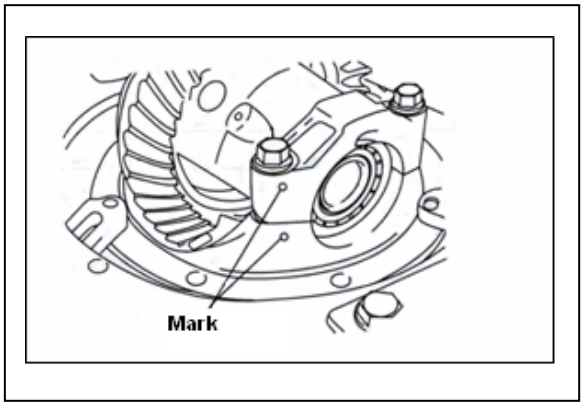

Contact ways of standard gear:
1. Small end;
2 Gear face on the forward direction of driven bevel gear;
3. Big end;
4. Gear face on the backward direction of driven bevel gear
Trouble
Solution
Contact area that the instal ing distance of driving bevel gear is over long.
An over long distance between driving and driven bevel gears
Thicken the installing distance adjusting washer of driving bevel gear so as to make driving bevel gear close to the center of driven bevel gear. At the same time, move driven bevel gear out to gain a required gear side play.
Contact area that the installing distance of driving bevel gear is over short.
An over short distance between driving and driven bevel gears
Thin the installing distance adjusting washer of driving bevel gear so as to move driving bevel gear far away from the center of driven bevel gear. At the same time make driven bevel gear close to the center of driving bevel gear to gain a required gear side play.

Disassembly

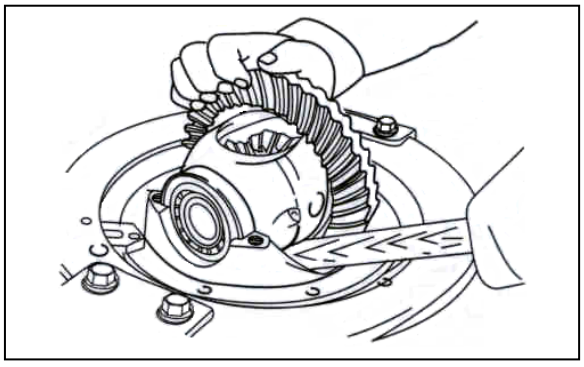
·Make a paired matching mark to ensure every part can be re-assemble back to its original position after disassembly.

· Disassemble the bearing cover and its connecting bolts. Prize the differential assembly by a wooden stick or a hammer. Separate the right bearing, left bearing and bearing cover when store, so that the parts can be assembled to their original positions without mixing.

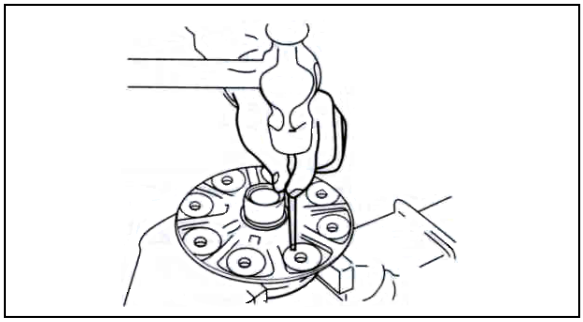
· Pull out the inner race of differential bearing by using a shaft bearing replacer.



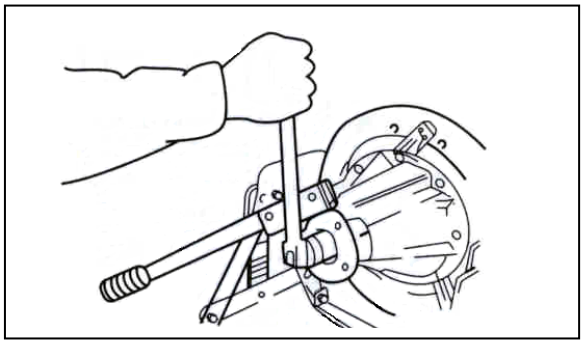
·Mark a position mark on differential housing and driven bevel gear. Loosen the connecting bolts on driven bevel gear as per a diagonal line order step by step so as to disassemble the driven bevel gear.



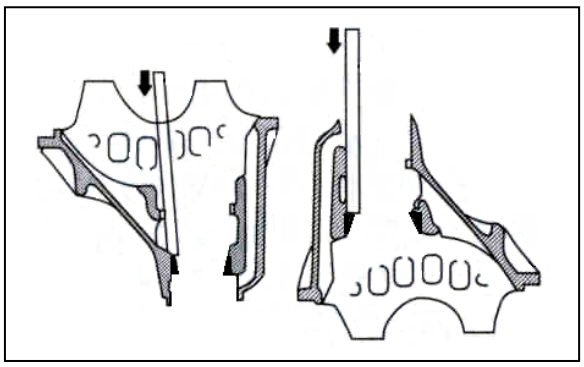
· Rush out the cylindrical pin that used for loosen proof with a punch. Take off the planetary bearing, planetary gear, spherical surface washer, half rear axle gear and adjusting washer.



· Clip the connecting flange with a special tool. Remove locknut from connecting flange. No locknuts that have been disassembled are allowed to reuse except the new ones.
· Take off the connecting flange after marking a position mark on the driving bevel gear and connecting flange.



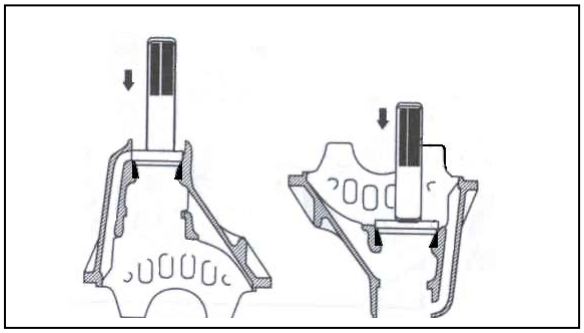
·Remove the driving bevel gear, together with inner race of rear axle, sleeve gasket, adjusting shim(allow to knock with a wooden hammer).



·Check the roller and ball track on the inner races and outer rings of rear and front bearing. If they get broken, remove the inner races and outer rings with a special tool. If there is no need to replace them, just adjust the position of driving bevel gear and may remove the inner races of front bearing only.

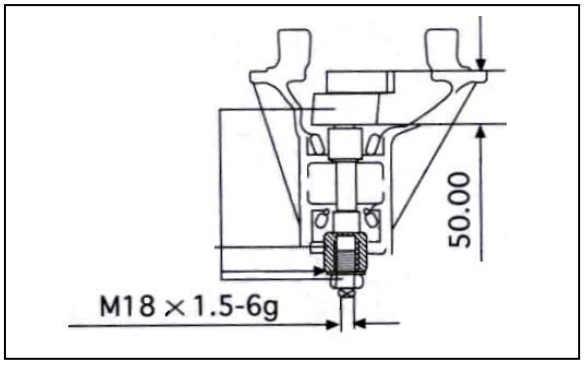
Installation and adjustment

Driving bevel gear assembly

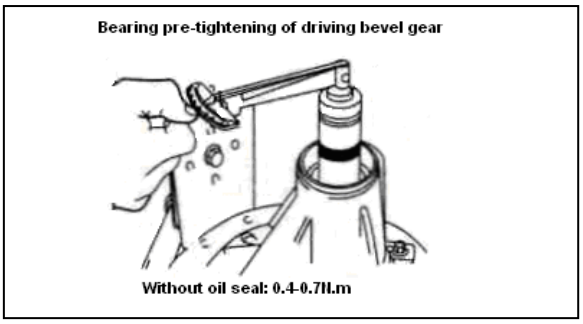


· Press the outer rings of front and rear bearing into the correct position of the bearing support well with a special tool.
· Make sure the thickness of adjusting shim for driving bevel gear installation distance according the following process:

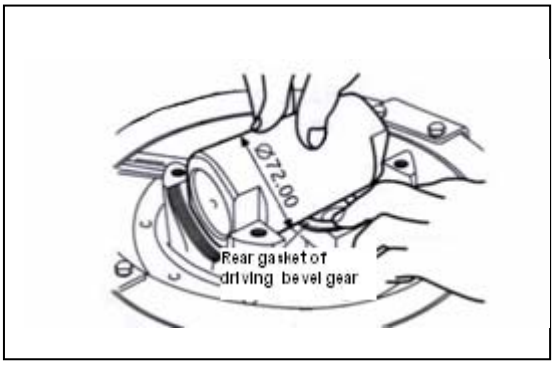
① Assemble the front and rear bearing and special tools inside the bearing support as shown in the figure. Before assembly, every matching surface of special tools should be applied a thin layer of lubrication.



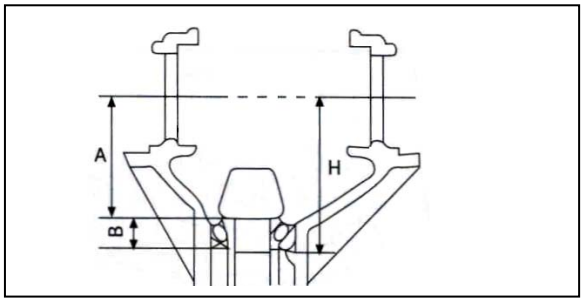
② Tighten the locknut of special tool up to gain a standard bearing pre-tightening.
③ Measure the bearing pre-tightening of driving bevel gear (without oil seal) with a torque wrench. Tighten the nut of special tool gradually while checking the pre-tightening.



④Put another special tool inside of differential bearing support. Choose a group of adjusting shim whose thickness is equal to the clearance between those two special tools.



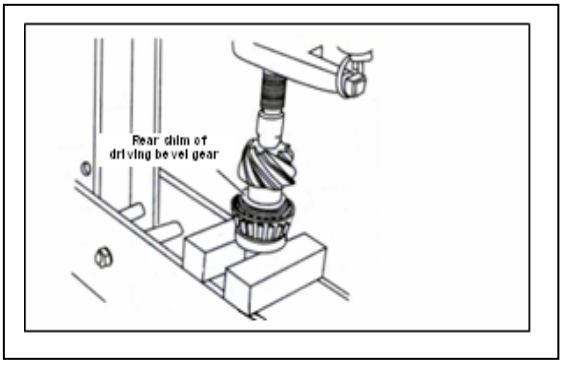
⑤ If there is no available special tool to use, measure the distance from center line of differential bearing to the end face of rear bearing hole on driving bevel gear as A; the height of rear bearing as B; the actual installing distance of driving bevel gear as A (A should be marked on the small end face of driving bevel gear. If it hasn't been marked yet, adopt a nominal value as 86). The thickness of adjusting washer: D=H-B-A.



·Install the adjusting shim of installing distance whose thickness chosen as above onto the driving bevel gear(the least quantity of washer), then make sure to press the rear bearing inner race down to the bottom of driving bevel gear.
· Select thickness of front bearing adjusting shim for driving bevel gear according to the following process:

① Install sleeve gasket, adjusting shim for tightness force of driving bevel gear, front bearing inner races, connecting flange and special nuts into the driving bevel gear in turn (not include oil seal).

② Tighten the special nut to a specified torque of 170-220 N·m, and then check the gear starting torque(bearing pre-tightening).



③ If the bearing pre-tightening is not included in the standard range, replace its pre-tightening adjusting shim. If bearing pre-tightening is larger than the standard value, enhance the thickness of adjusting shim; whereas reduce the thickness.

·Disassemble the connecting flange and the driving bevel gear again. Assemble oil seal to bearing support, and apply the lubrication on the mouth of oil seal.

·Reassemble the driving bevel gear so that the driving bevel gear can be aligned to connecting flange. And then screw a new locknut up to the specified torque of 170-220 N·m, and then rivet the locknut on the notch position of screw thread of the driving bevel gear with a special tool.

·Recheck and verify the bearing pre-tightening of driving bevel gear (with oil seal: 0.6-0.9 N·m).

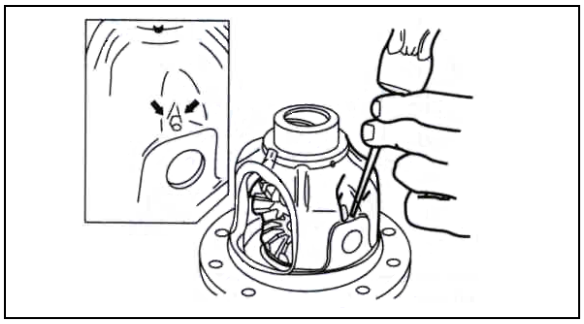
Attention

Loosening the locknut backwards to reduce the bearing pre-tightening for the purpose for achieving the standard value is not allowed.

Reducer Assembly

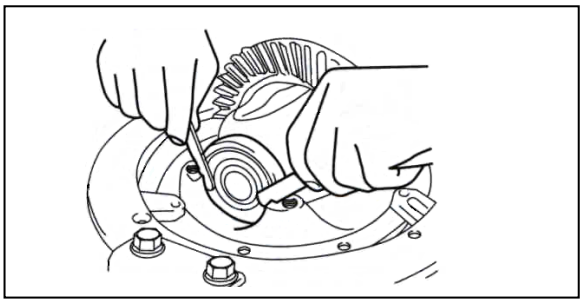
·Assemble the half rear axle gear, adjusting shim, planetary gear and ball washer into the differential housing.

·Insert the planetary axle(not include the loosen proof cylindrical pin for the moment).



·Adjust the differential gear pair side play. Use a dial indicator to check the gear side play of planetary gear and half rear axle gear pair. You may achieve a proper side play by changing the adjusting shim thickness of half rear axle gear. After adjusting well, the gear pair will rotate flexibly without any clamping stagnation. Here are some type of the thickness of adjusting shim: 0.85、0.90、0.95、1.00、1.05、1.10、1.15 and so on.

·Install the loosen-proof cylindrical pin. Punch two points on the edge of pin hole on differential housing with a dotting punch so as to avoid pin dropping out.



· Install the driven bevel gear in the differential housing and mark by aligning with the position. Connect them by connecting bolts, which should be coated appropriate amount of anaerobic glue（e.g. Loctite glue 242）on the surface of screw thread to avoid loosening

when installing.

·Gradually tighten the connecting bolt up to the specified torque as per an order of diagonal line.

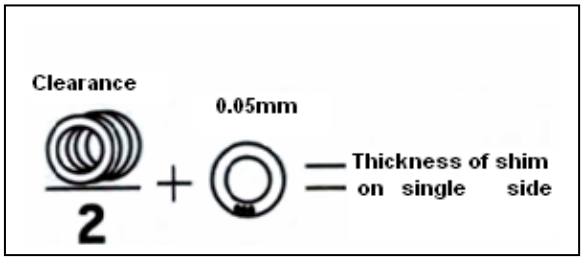
（Tightening Torque：65-70 N·m）

·Adjust gear pair side play of reducer as per following process:

① Tightly press the differential bearing inner race onto the differential mechanis(not include adjusting shim for the moment).

② Assemble the differential assembly into bearing support. Push it to one side (include bearing outer ring) to measure the clearance between the bearing support and the end face of differential bearing outer ring.

· Remove the bearing inner race from differential housing in order to install the adjusting shim of differential bearing. Thickness of the single side adjusting shim for differential bearing=a half of measured clearance value + 0.05 mm (this thickness is provided for the purpose of ensuring bearing pre-tightening).

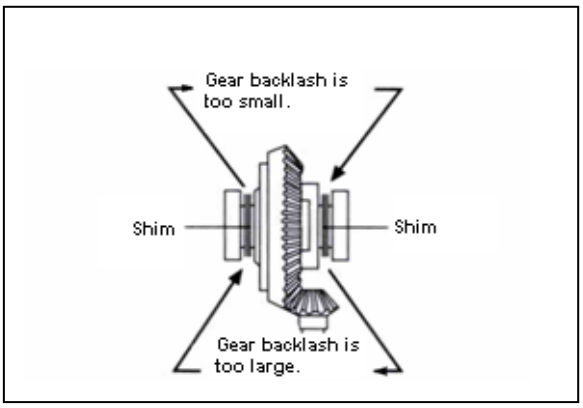


·Choose two adjusting shims according to the thickness of single side adjusting shim as showed above (least quantity), install them in the two sides of differential housing, and then press them into the bearing inner race.

·Assemble the bearing cover of two sides according to position marks. Fit on the connecting bolts with a specified torque.

（Tightening Torque：35～40 N·m）

·Check the reduction gear pair side play as per the methods above. If the side play does not meet requirements, adjust it as shown in the figure till it meets the requirements.



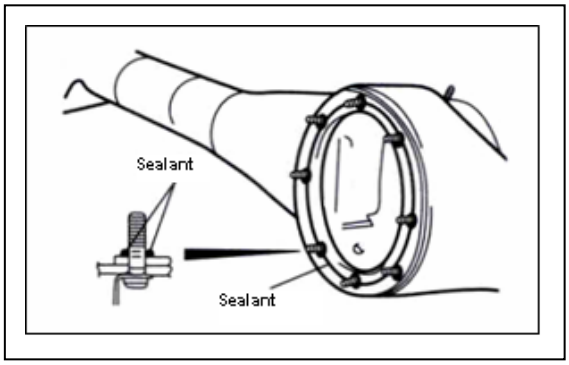
·Check the contact area of the teeth surface of reduction gear pair as per the methods above.

·Check the end face run-out of driven bevel gear as per the methods above. If the run-out range has exceeded limiting value, find out the reasons and remove the trouble.

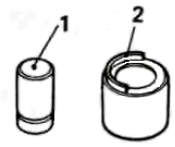
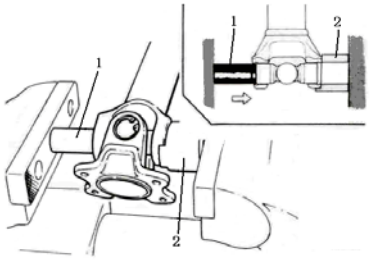
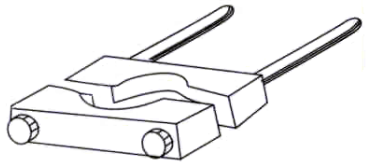
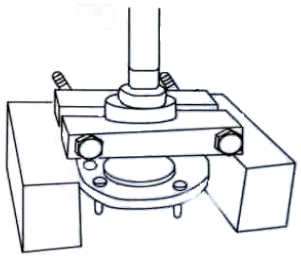
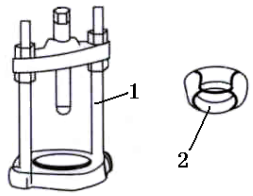
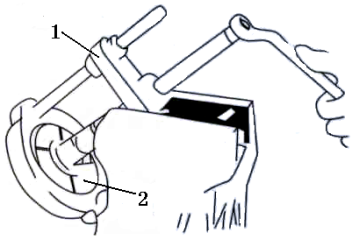
Assembly

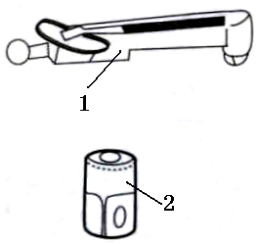
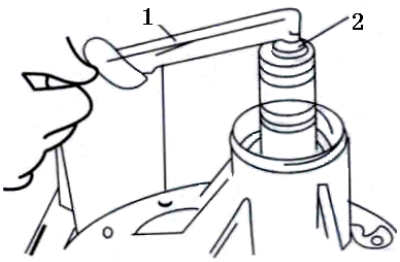
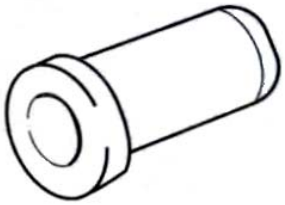
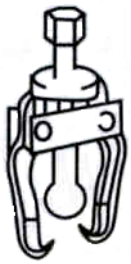
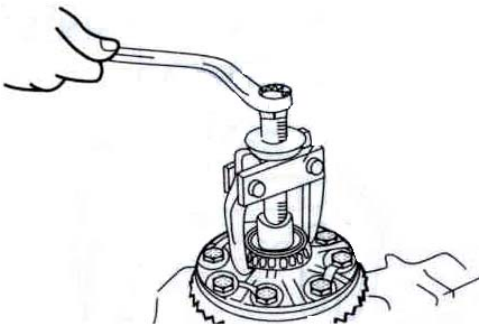
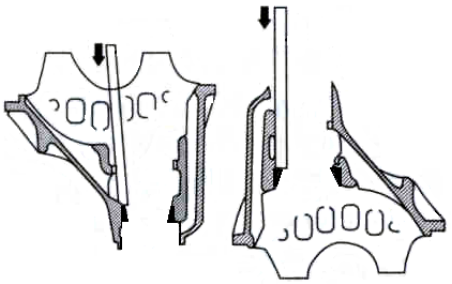
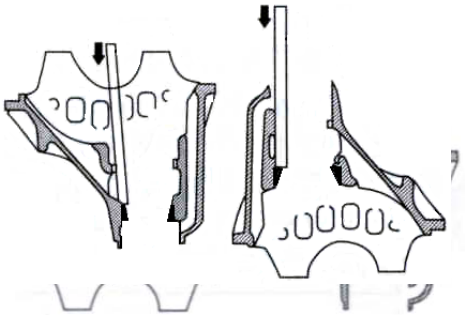
Assemble the reducer assembly onto rear axle housing assembly. Remove the used sealant on the position as shown in the figure before installation, and apply the new semi-dry sealant on it.

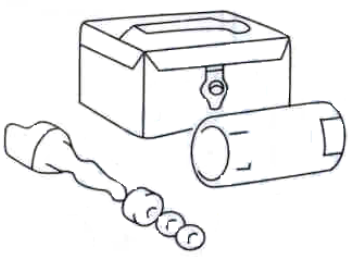
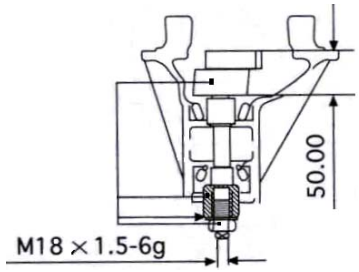
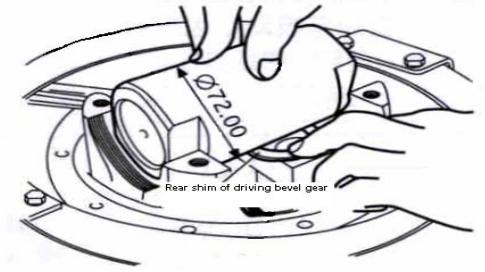
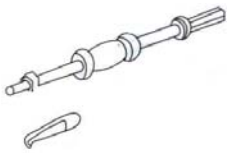
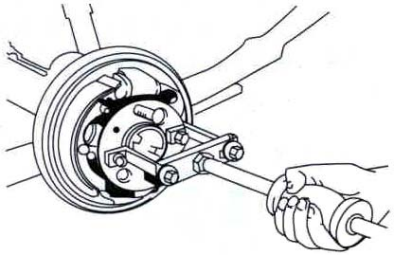
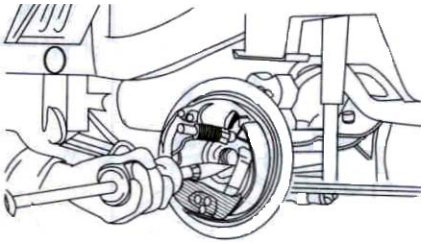
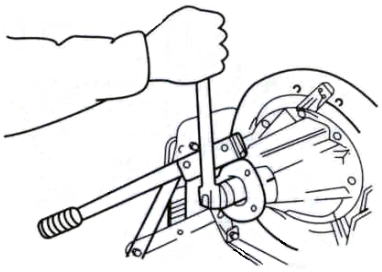
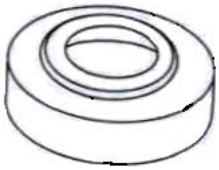
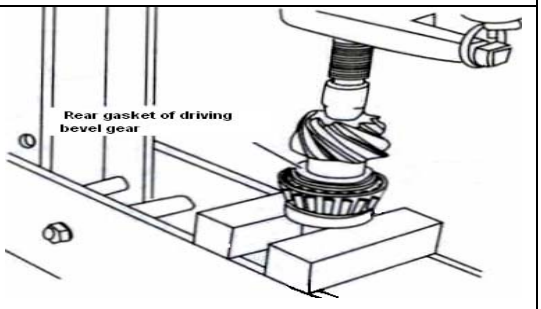
Tightening Torque：24~29 N·m



4.3.6 Special Tools

Tools(Number and Name)	Application	Methods
Bearing puller and bearing installing tool for universal joint 1. Guide Pillar 2.Seating 	Disassemble and assemble of the universal joint bearing of drive shaft	
Shaft bearing replacer 	Disassemble the half rear axle bearing	
Shaft bearing replacer 	Disassemble the rear bearing inner race of driving bevel gear	

Tools(Number and Name)	Application	Methods
1. Torque Spanner 2. Sleeve 	Measure the bearing pre-tightening of driving bevel gear	
Installing tool for oil seal of driving bevel gear 	Install the oil seal of driving bevel gear by pressing.	
Shaft bearing replacer of differential 	Disassemble the bearing inner race of differential	
Shaft bearing replacer for outer ring of driving bevel gear 	Disassemble the bearing outer ring of driving bevel gear	
Bearing installing tool for outer ring of driving bevel gear 1. Press bar 2. Briquetting	Install the bearing outer ring of driving bevel gear by pressing.	

Installing distance measurer assembly of driving bevel gear 	Measure the installing distance of driving bevel gear	 
1.Stripping attachment of Half rear axle 2. Sliding ham 	Disassemble the half rear axle	
	Disassemble the oil seal of half rear axle	
Flange bracket 	Disassemble the connecting flange	
Bearing installing tool 	Install the rear bearing inner race of driving bevel gear by pressing.	

Chapter 5 Brake System

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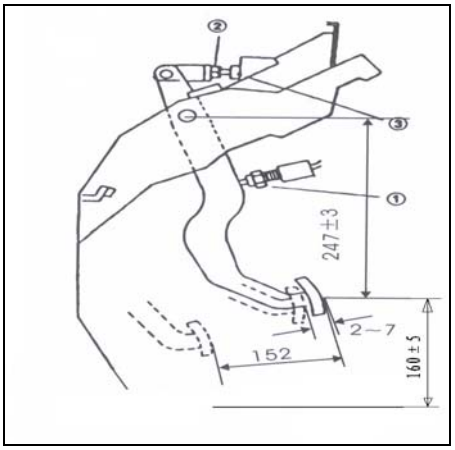
5.1 Check and Adjustment of Brake

5.1.1 Check and Adjustment of Brake Pedal



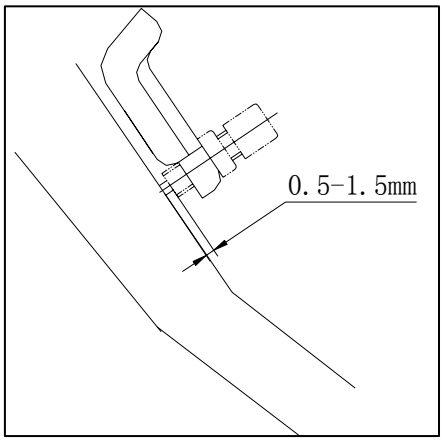
· Measure the height of brake pedal**,** its standard value should be 160±5mm ; If failing to meet requirements, the methods for adjustment are as below:

（1） Unscrew the service braking light until it does not connect with the brake pedal rod.

（2） Loosen the stop nut on push rod; rotate the push rod to change the position of rod fork, and then adjust the height of brake pedal, after the requirements are met, screw the stop nut.

Adjust the service braking light switch again, its clearance is 0.5-1.5 mm, at the same time, screw the stop nut of braking light switch tightly.

5.1.2 Adjustment of Brake Pedal in Free Stroke



· Depress down the brake pedal until an obvious resistance is felt. At that time, the stroke of brake pedal is the free stroke; its standard value is 2-7mm.

If the free stroke is too long, that is because the clearance between the push rod and the brake master cylinder piston is too large. If the free stroke is too short, it is possible that there is no clearance between the push rod and the brake master cylinder piston or adjustment of the service braking light switch does not meet the requirements, were this to happen, make the adjustment according to the above-mentioned methods.

5.1.3 Adjustment of the Height for Brake Pedal

Step on the brake pedal with 300 N force, measure the stroke of brake pedal, its standard value is not more than 100mm, the total stroke of brake pedal is 152mm, if the distance exceeds its standard value, the following reasons should be considered in repair and adjustment.

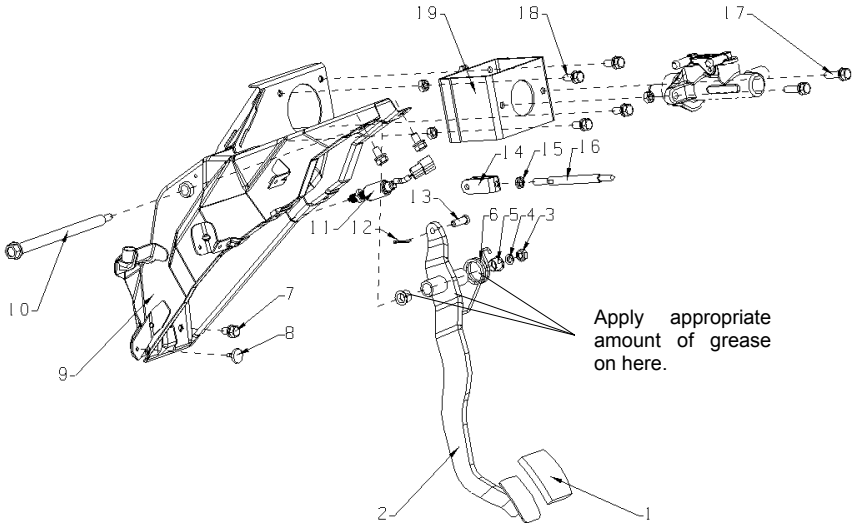
（1） Air in the brake pipes

（2） Leaked in the brake pipes

（3） The clearance between the brake push rod and the brake master cylinder piston is too large.

（4） Brake shoe is badly worn.

5.2Brake Pedal and Brake Bracket Assembly



1. Pedal slipcover 2. Brake pedal rod welded assembly 3. Nut M8 4. Washer 8
5. Bushing 6. Torsion spring of brake pedal rod 7. Bolt assembly M8x16-8.8
8. Buffer rubber mat 9. Brake Bracket welded assembly 10. Axis pin of pedal rod
11. Service braking light switch assembly 12. Pin 2.5×20 13. Axis pin B8×24 14. Rod fork
15. Nut M8 16. Push rod 17. Bolt assembly M8 × 30 18. Bolt assembly M8 × 20
19. Master cylinder mounting bracket welded assembly

5.2.1 Maintenance Guide

Disassembly, Maintenance and Assembling

1） Remove the bracket assembly from the vehicle body.

Remove the steering column according to the methods for disassembling the steering column jacket pipe in Chapter 2 and put it down.

Remove the brake pedal and brake bracket assembly, together with the brake master cylinder assembly from the vehicle; disconnect the nuts used for installing the brake master cylinder to take off the brake cylinder, and remove the cotter pin and axis pin that connect with the brake pedal assembly and the rod fork, and then screw off the nuts on the master cylinder mounting bracket welded assembly to take off the master cylinder mounting bracket welded assembly from the brake bracket.

2) Disassemble the brake pedal according to the following sequence:

Nut(3)- Washer - Axis pin of pedal rod - Brake pedal rod welded assembly - Torsion spring of brake pedal rod – Bushing - Pedal slipcover - Buffer rubber mat

3）Check and replace damaged parts.

4）Apply appropriate amount of grease according to the position again as shown in the figure.

5）Assemble the bracket assembly according to the sequence contrary to disassembly sequence.

Check

1) Check the height of brake pedal: its standard value is 155-165mm; if the requirements can not be met, refer to Section 5.1.1 to adjust them.

1） Check the free stroke of brake pedal: the free stroke of brake pedal is 2-7 mm. Refer to Section 5.1.2 to adjust them when exceeding the requirement prescribed.

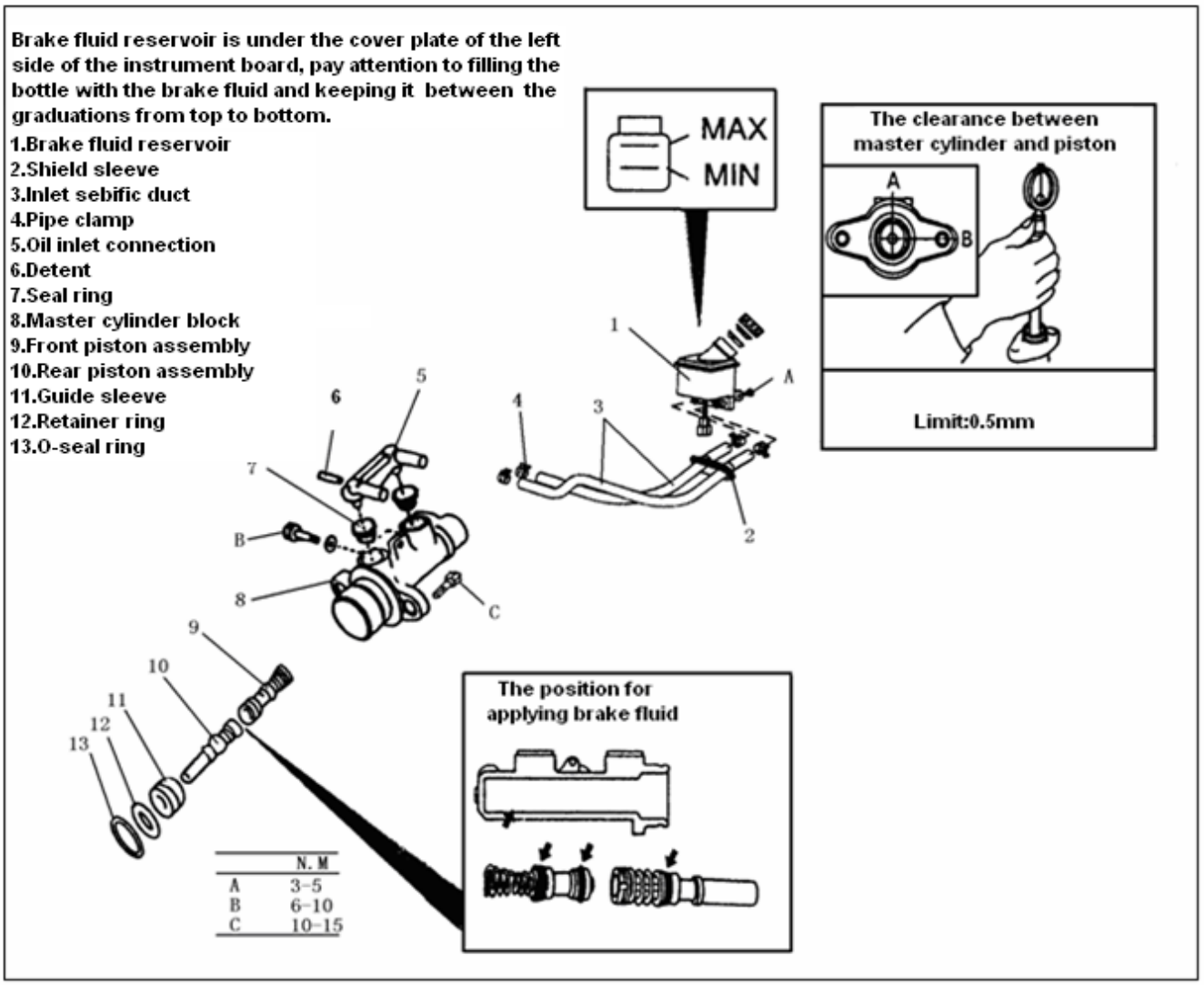
5.3 Brake Master Cylinder Assembly

5.3.1 Specifications

Type: Double series-wound chambers

Internal diameter: 20.64mm

5.3.2 Master Cylinder Assembly



5.3.3 Maintenance Guide

Checking Master Cylinder

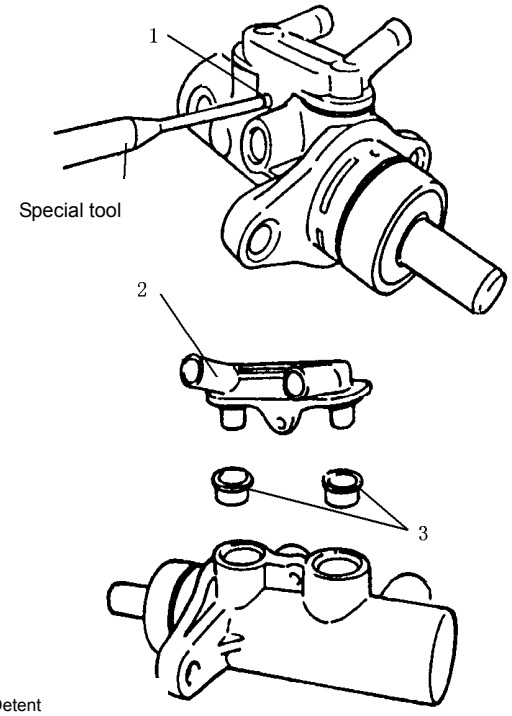
Check if there are cracks in the master cylinder casting or brake fluid around the master cylinder.

If a little fluid is available, it shows leakages exist. It is also not normal phenomenon when moist regain.

Disassembly

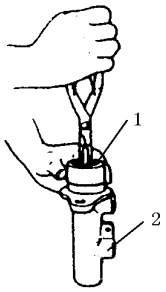
1）Use a special tool to unscrew the detent that is used for fixing the connection.

2）Remove the connection and two seal rings.



1. Detent
2. Oil inlet connection
3. Seal ring

3）Remove the retainer ring.



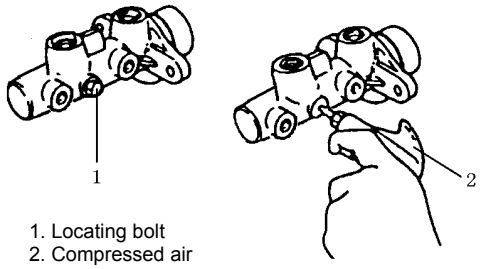
1. Retainer ring
2. Master cylinder

4）Take off the guide sleeve and the primary piston. Remove the locating bolt for piston, and then blow in compressed air through the locating bolt on the piston, take off the secondary piston.

When disassembling the secondary piston, special care must be taken, because it is possible to spring out.

Attention:

- **Operate on a clean working table without mineral machine oil.**
- **No compressed air with lubrication oil is allowed to use.**



1. Locating bolt
2. Compressed air

Checking

Check that the parts that are disassembled are worn or damaged. Replay them if necessary,.

Attention:

- **Clean disassembled parts with clean brake fluid.**
- **The original accessories in repair kits must be used to replace parts.**

Check that there are scratches or corrosion in the master cylinder，better replace corroded cylinder.

If the cylinder block has mechanical pitting or too rough, it shows the cylinder has corroded.

Attention:

- **Never use any grinding material for polishing the cylinder with cast aluminium pedestal.**

After rinsing the master cylinder, always shake off the brake fluid on the master cylinder, but do not wipe it with a piece of cloth because fine hairs on the cloth can adhere to the surface of the cylinder block.

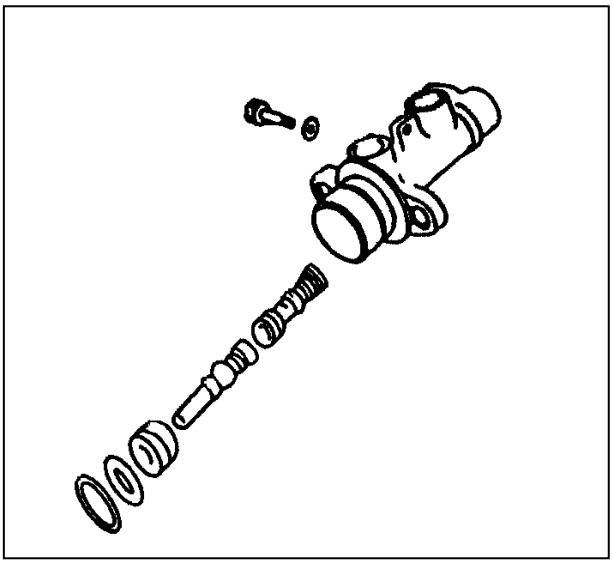
Assembly

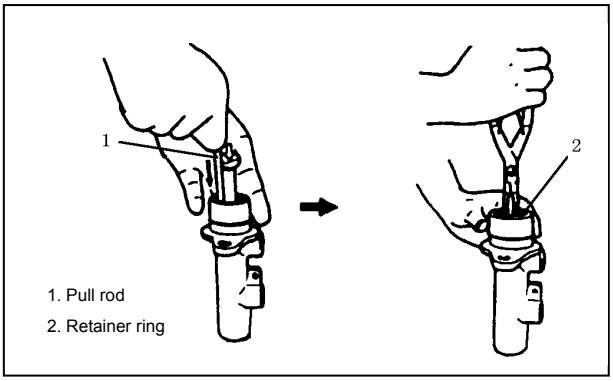
Attention:

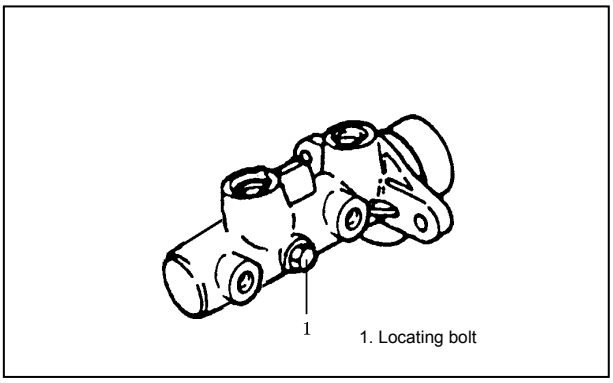
- **When cleaning and assembling the parts, do not use any mineral oil such as kerosene and gasoline.**
- **Check and ensure there are no impurities such as dust and dunghill in the inside wall of cylinder, piston, and packing leather sealing parts. always be careful when assembling with tools, or damage will be resulted in.**
- **No parts are allowed to fall off, never use a fall of any parts.**

1）Apply brake fluid on the inside of the master cylinder and the contact surface of the piston assembly. Insert the secondary piston assembly into master cylinder. Make sure the direction of installation for piston packing leather is correct and the piston packing leather does not seize up and stop when inserting it into the cylinder straightly.

2）Install the primary piston and the guide sleeve into







the cylinder.

3)Push the retainer ring in and install it.

4)Push the whole piston, and then install the locating bolt for piston. Tighten them according to the specified torque.

Tightening torque

（a)：6-10N·m

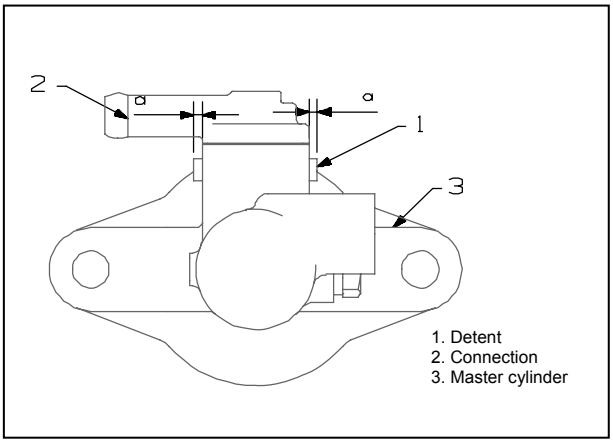
5）Apply a thin layer of brake fluid around two new seal rings and install them in the cylinder block, and then fit the brake fluid reservoir.

6）Install a new pin into the hole in the connection and screw it in. At the same time, make the length of the surface of the pin end equal to that of the connection spare end.

5)After finishing the installation, check the end play of brake pedal, and discharge air in the system.

(Refer to the check on the end play of brake pedal and the exhaust of brake.)

6 ） Carry out brake test; check that each of installation parts leaks oil.



Installation

Attention:

- **The specified torque value is applicable to dry and non-lubrication fasteners.**
- **Check the clearance between the booster piston rod and the master cylinder piston.**
- **Adjust the length of the booster piston rod with special tools.**

1) Install the master cylinder as shown in the figure; tighten the nuts according to the specified torque.

Tightening torque:

（a）10-16N·m

2)Install the hydraulic tube; tighten the tubing connecting nuts according to the specified torque.

Tightening torque

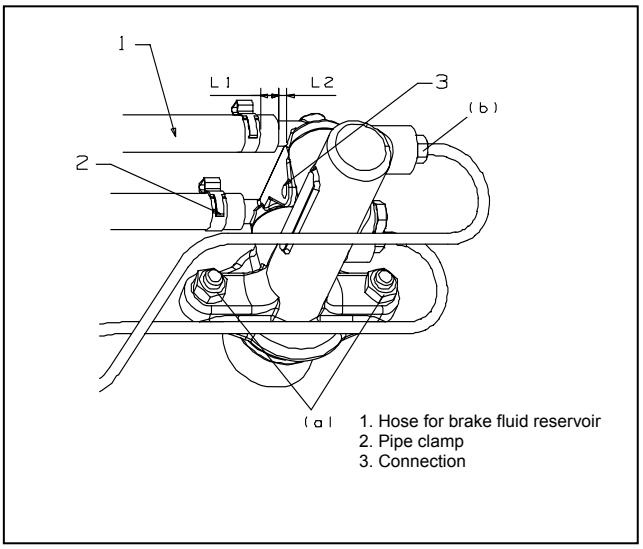
（b）15~22N·m

3)Connect the hoses for brake fluid reservoir.

L1：4±2 mm

L2：Less than 5 mm

4)Fill the brake fluid reservoir with the prescribed brake fluid. (Refer to the figure shown in 5.3.2. for filling fluid lever in detail.)

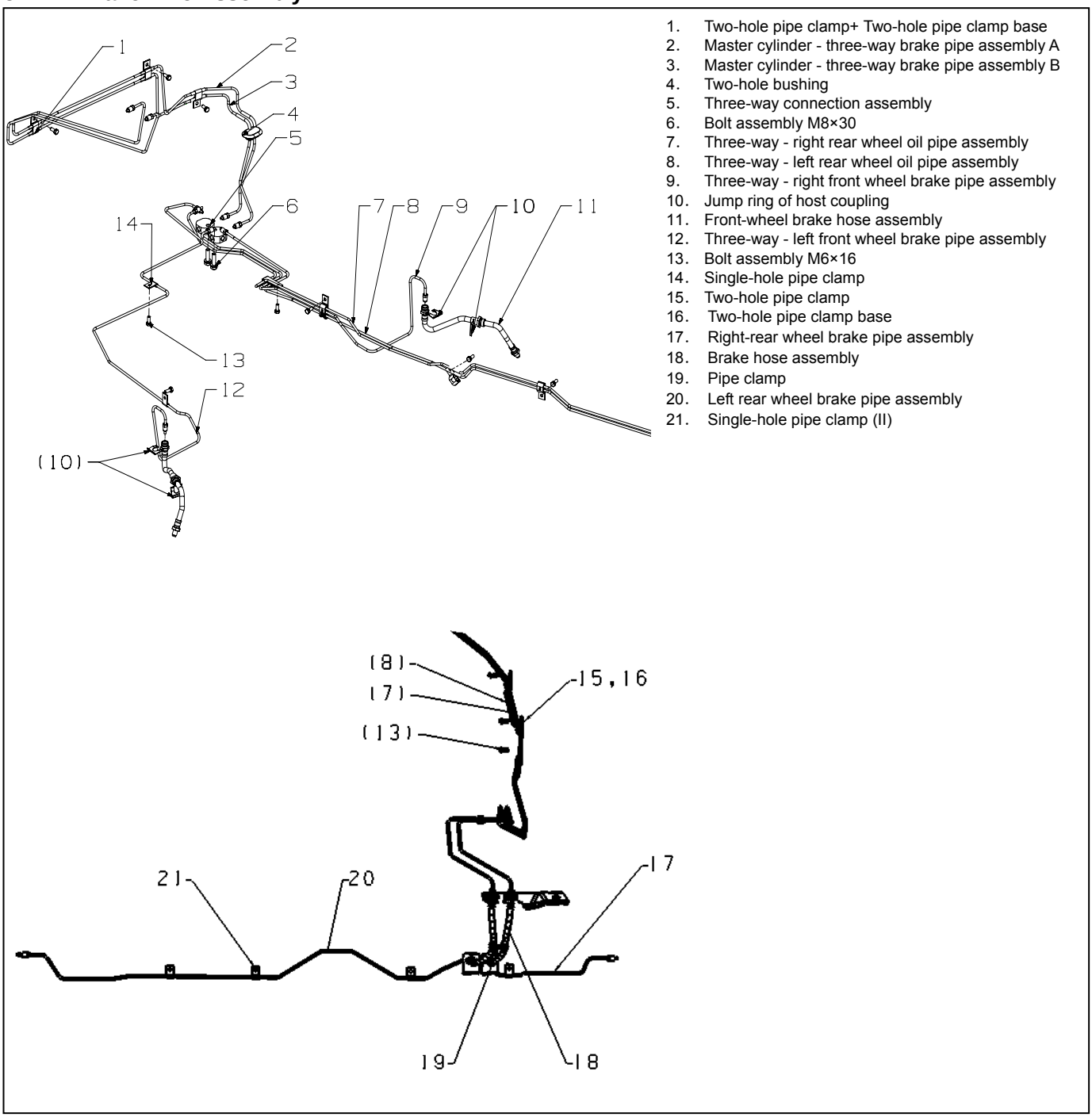


5.4 Brake Line Assembly

5.4.1 Specifications

φ4.75×0.71 bundy tube

5.4.2 Brake Line Assembly



1. Two-hole pipe clamp+ Two-hole pipe clamp base
2. Master cylinder - three-way brake pipe assembly A
3. Master cylinder - three-way brake pipe assembly B
4. Two-hole bushing
5. Three-way connection assembly
6. Bolt assembly M8×30
7. Three-way - right rear wheel oil pipe assembly
8. Three-way - left rear wheel oil pipe assembly
9. Three-way - right front wheel brake pipe assembly
10. Jump ring of host coupling
11. Front-wheel brake hose assembly
12. Three-way - left front wheel brake pipe assembly
13. Bolt assembly M6×16
14. Single-hole pipe clamp
15. Two-hole pipe clamp
16. Two-hole pipe clamp base
17. Right-rear wheel brake pipe assembly
18. Brake hose assembly
19. Pipe clamp
20. Left rear wheel brake pipe assembly
21. Single-hole pipe clamp (II)

5.4.3 Maintenance Guide

Disassembly

1）Lift the automobile and support it reliably, remove the tires and wheels. (When removing the pipelines that connect the master cylinder and two-way coupling, do not use this operation.)

2）Clean off the dunghill and impurities from the hoses and installation parts at the end of the hoses. Remove the front and rear brake hoses or pipelines.

Checking

Oil pipes and hoses must be in good condition, they do not allow being shrunken or fractured due to collision and being rusted, if the hoses become swelling, ageing, etc., replace them in time, or they influence traffic safety.

Installation

Install the brake hoses as per the reverse process, and
tighten the oil pipes according to the specified torque.
Tightening torque

（a）：15-22N·m

Attention:

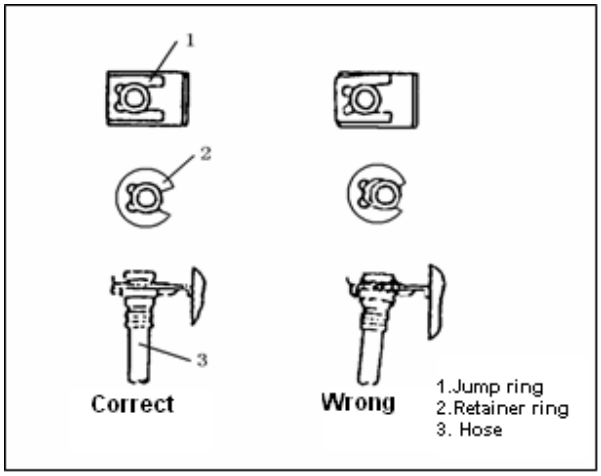
- **Never reuse the removed retainer ring and jump ring, always replace them with new ones.**
- **The jump ring and the retainer ring should be correctly installed in the neck of brake hose coupling.**
- **When installing the hoses, make sure the hoses connect without twist.**
- **In any case, hoses and brake hoses are not allowed to be in contact with other parts (except pipe clamps and bushings).**

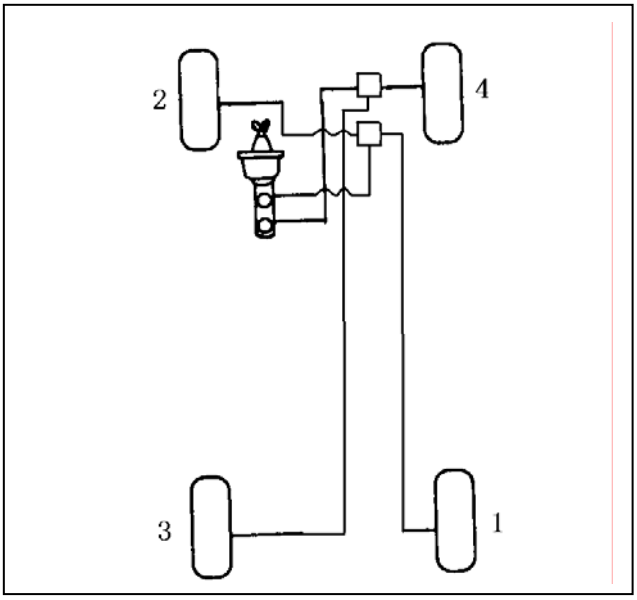
Exhaust of Systems

1)Fill the brake fluid reservoir with brake fluid; make the fluid lever rise to the specified position.
2)Repeatedly carry out bleeding according to the sequence shown in the figure until the fluid no longer contains air bubbles when it flows from the wheel cylinder.
3)Tighten the bleed screws, and then fix the dust caps on the air bleed screws.
4)Fill with brake fluid up to the specified position.
5)Carry out brake test, check that the installation parts leak.

Attention:

- **Apply recommendable Zhangjiagang Teec Brake Fluid, if different brake fluid mix, brake fluid will appear delamination and low boiling point so that its braking ability is influenced.**
- **Storage of brake fluid should be sealed and covered tightly.**
- **Always replenish brake fluid with the same specifications.**





5.5 Front Wheel Brake

5.5.1 Specifications

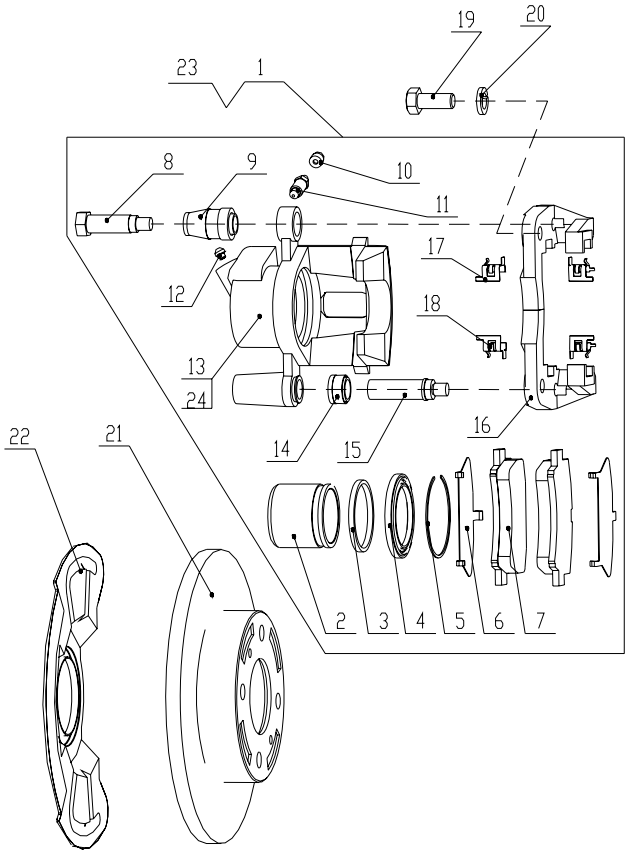
Type: Disc brake

External diameter of brake disc（mm）：¢237　　Internal diameter of brake disc（mm）：¢138

Thickness of brake disc（mm）：13　　Thickness of friction block（mm）：15

Internal diameter of front brake wheel cylinder（mm）：¢50.8

1. Left brake caliper assembly
2. Front wheel brake piston
3. Seal ring
4. Dust guard of Front-wheel brake piston
5. Jump ring of dust guard
6. Noise reduction piece
7. Brake pad
8. Guide bar
9. Dust guard (II)
10. Dust guard
11. Bleed screw
12. Joint in oil pipe
13. Left brake caliper body



14. Dust guard(I)
15. Locating rod
16. Supporting frame
17. Gasket of brake pad (I)
18. Gasket of brake pad(II)
19. Bolt
20. Washer 12
21. Brake disc
22. Dust excluding plate
23. Right brake caliper assembly
24. Right brake caliper body

5.5.2 Disc Brake

5.5.3 Maintenance Guide

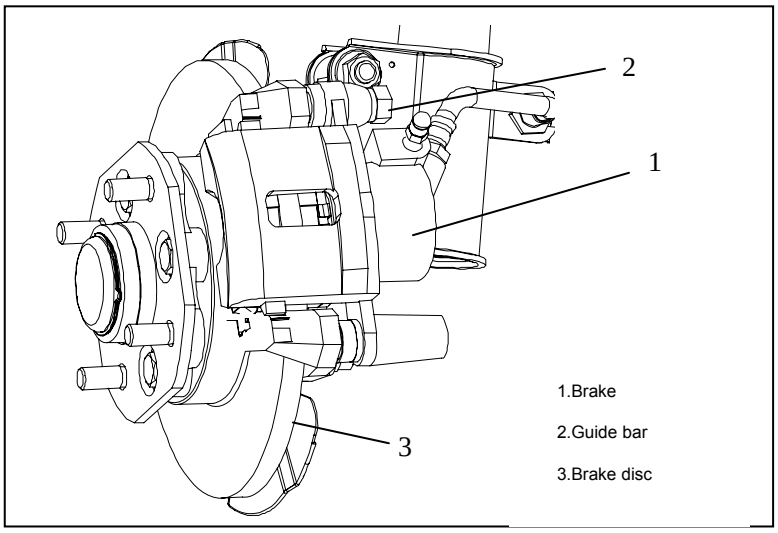
Disassembly

(1)Use a jack to jack up the wheels from the ground, remove the wheels.

(2)Disconnect the U-jump ring used for fixing brake hoses, and take off the hoses from the supporting frame.

(3)Remove the guide bar of the brake caliper.

(4)Remove the brake caliper from the supporting frame.



(5)Remove the brake pads.

Attention:

- **Remove the brake caliper with a wooden cushion pad; prevent the brake hoses from bending, twisting and dragging too much.**
- **After removing the brake pads, the brake pedal is not allowed to step on.**

Checking Brake Pads

Check the attrition rate of lining on the brake pads, when they are worn excessively, new ones should be replaced.

Attention:

- **No sand papers are allowed to use to polish the brake pads, otherwise hard particles of the sand papers can seep into the linings, and it is possible to damage the brake disc. When the brake pads need to be replaced, brake pads in the left and right wheel should be replaced together.**

Thickness of brake pads (Lining + Steel backing of brake pads)

Standard value: 15mm

Ultimate value: 7mm

Attention:

- **When removing the brake pads, always observe the brake caliper to check if the brake fluid leaks. If leaking, always repair it.**

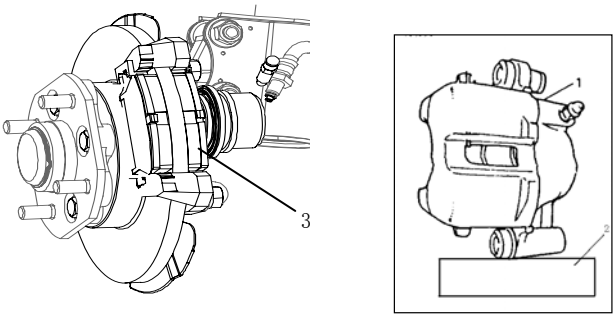
Guide Bar/Locating Rod

Check that locating rod moves flatly and smoothly as shown in the figure.

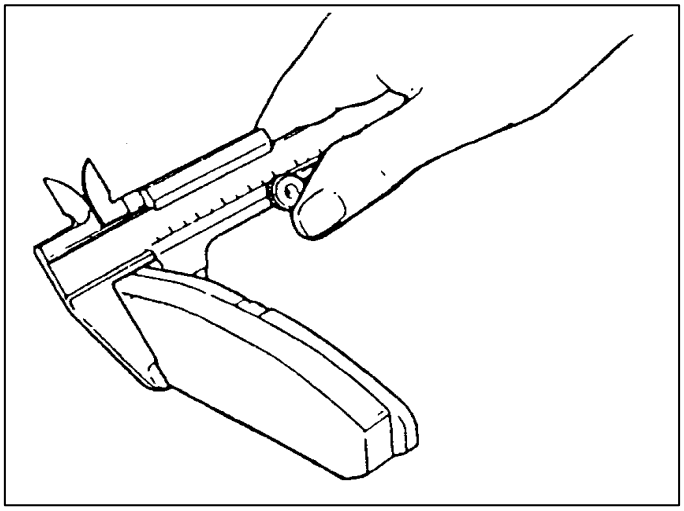
If finding any damage, repair and replacement should be carried out. Apply grease on the outer surface of guide bar and locating rod.

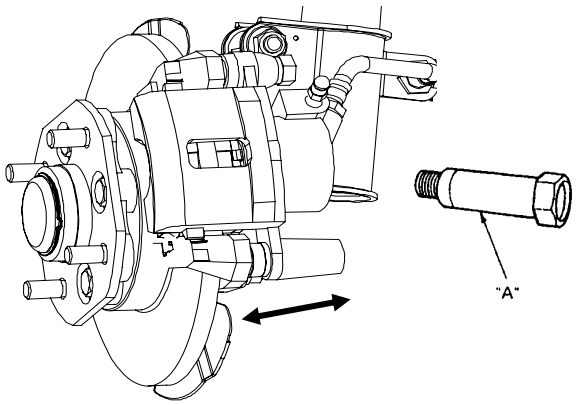
Dust Guard （Ⅰ）/（Ⅱ）

Check if there are quality problems such as crack, damage and so on. If any, repair them.



1- Brake caliper body 2-Wood brick 3-Brake pads





Apply grease on "A".

Brake Disc

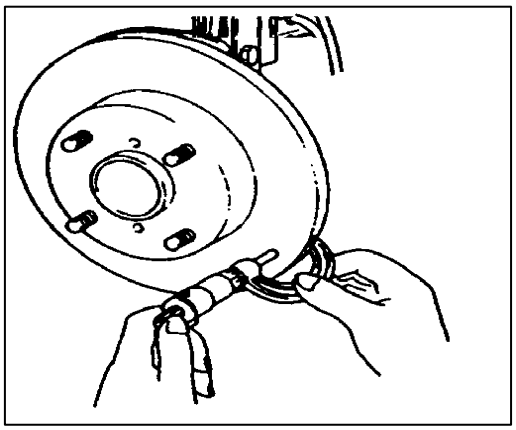
Check the scratches of the surface of brake disc and the friction parts.

Check the brake disc periodically; it is normal phenomenon when there are slight scratches on the brake disc. However, if the scratches are too deep or high, the brake disc should be replaced. If scratches are only at one side of the brake disc, always repair this position by polishing.

Thickness of brake disc

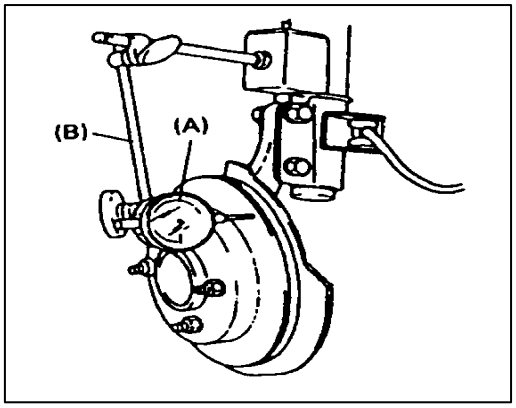
Standard value: 13.0mm

Ultimate value: 11.0mm



Fix the brake disc with wheel nuts, and then install a dial indicator, measure the oscillating quantity of the brake disc as shown in the figure. Choose two points at the circle and centre of the brake disc, and then rotate the brake disc, measure the oscillating quantity of the brake disc with the dial indicator.

Ultimate value for oscillating quantity of brake disc: 0.10 mm

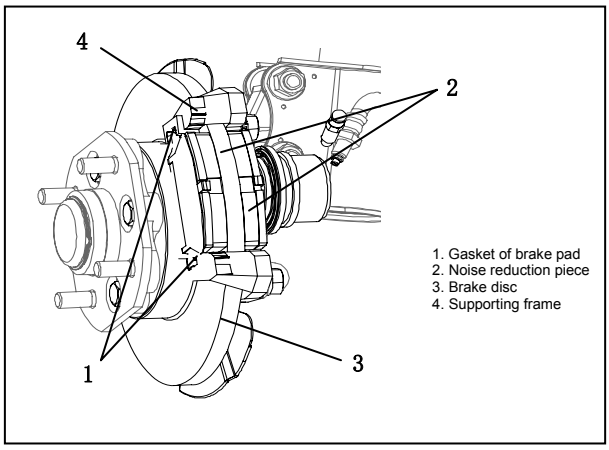


Attention:

- **Before measuring, always check that the hub become loose.**

Installation

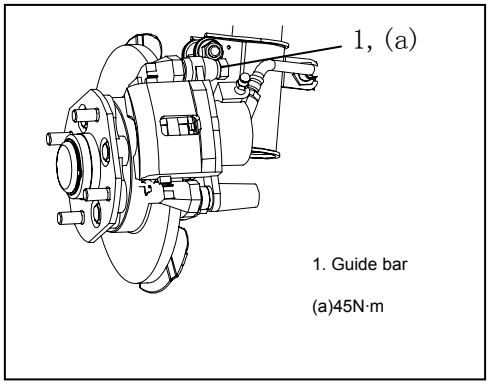
(1)Install the noise reduction panel in the brake pads, and then fit the gaskets of brake pads, mount the brake pads on the supporting frame.



(2)Install the brake caliper; tighten the guide bar according to the specified torque.

Attention:

- **Dust guard should be installed in the designated position.**



(3)Install the brake hoses in the supporting frame.

(4)Install the tires.

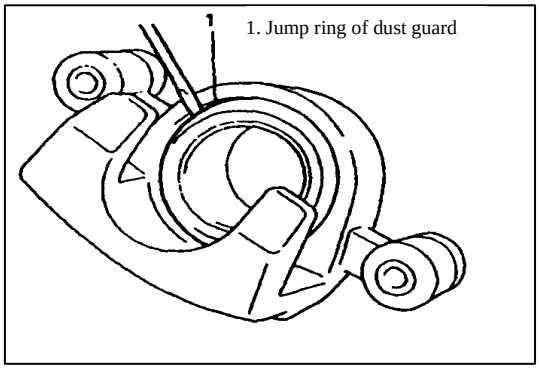
Brake Caliper Assembly

Disassembly

(1)Disassembly the brake hoses and the brake caliper.

(2)Remove the jump ring of dust guard with a flat-card tool.

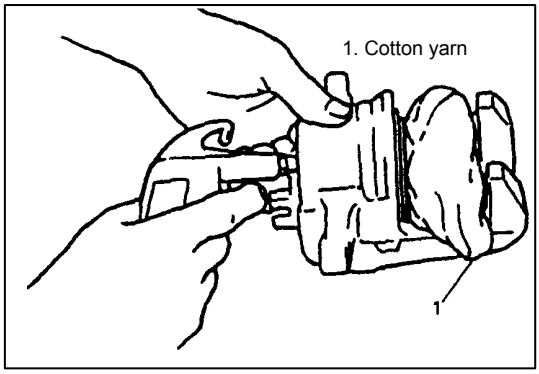
(3)Take off the dust guard from the front-wheel brake piston.



(4)Inject compressed air into the cavity of brake caliper through the bolt hole which is used for installing the brake hoses. The piston is pushed out of the cavity under the air pressure.

Attention:

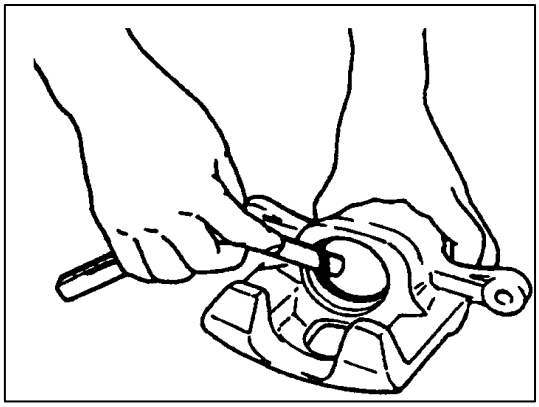
- **Do not inject compressed air with very high pressure, otherwise it can result in separation between the piston and the brake caliper. Extrude the piston by blowing the medium pressure of compressed air slowly. When using compressed air, do not put your hand in the front of the piston.**



（5）Remove the seal rings with thin cutter blade tools such as thickness gauge, etc..

Caution:

- **Take care never to damage the inner wall of the brake caliper cylinder.**



Checking

Dust Guard

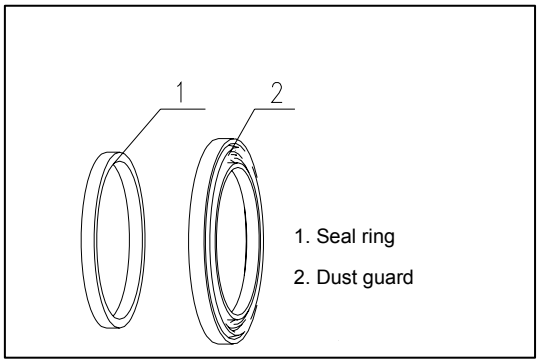
Check that the dust guard has breaches, cracks and damage. If there are any problems of dust guard, always replace it in time.

Seal Ring

Both heavy and uneven abrasions to brake pads are likely to reflect uneven piston return. Under the circumstances, seal rings should be replaced.

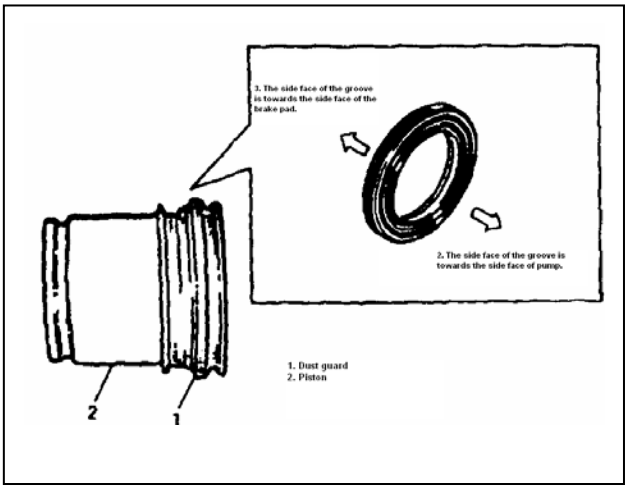
Attention:

- **Once seal rings are removed, new ones must be replaced.**



Assembly

Reassemble the brake caliper according to the sequence contrary to the disassembly. The following points should be adverted.

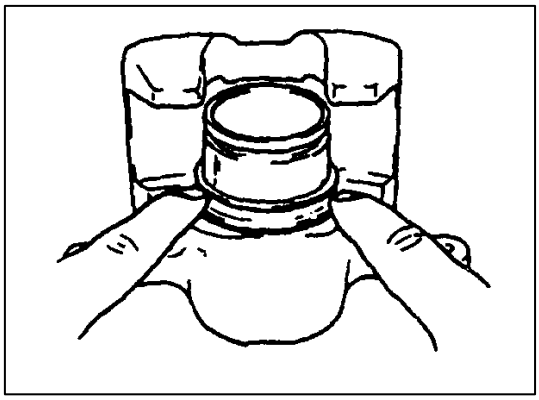

3. The side face of the groove is towards the side face of the brake pad.
2. The side face of the groove is towards the side face of pump.
1. Dust guard
2. Piston
2
1

Caution:

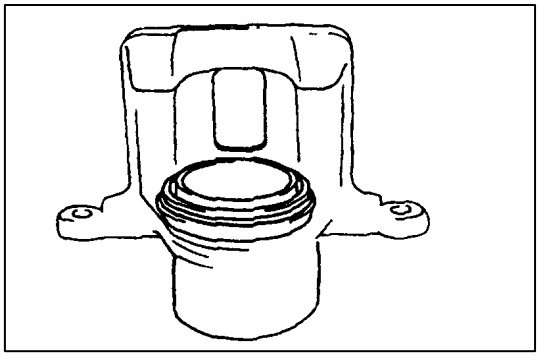
- **Before installation, clean each of parts with brake fluid.**
- **Do not allow to use other fluid or diluent.**
- **Before installing piston and seal rings in the brake caliper, apply brake fluid on the piston and the seal rings.**
- **After assembling the brake hoses again, bleeding should be carried out.**

（1） Install the seal ring into the seal groove of brake caliper, take care never to make it twist.

（2） Before insetting the brake caliper into the piston, install the dust guard in the piston as shown in the figure.

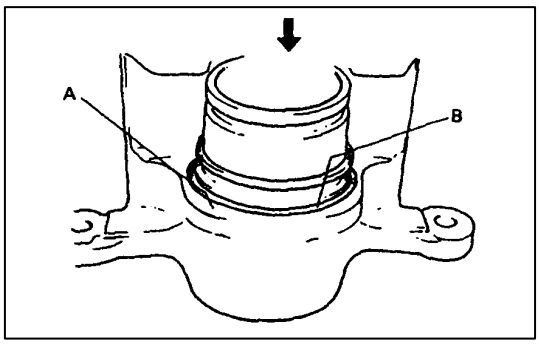


（3）Install the dust guard; press the dust guard into the groove of brake caliper with hands.



（4）Inset the piston into the brake caliper with hands; install the dust guard in the groove of the piston dust guard.

（5）In order to make sure the dust guard can be installed in the groove of brake caliper correctly, the piston should be pulled out a little from the inner of the brake caliper, but not all the piston is pulled out.



Attention:

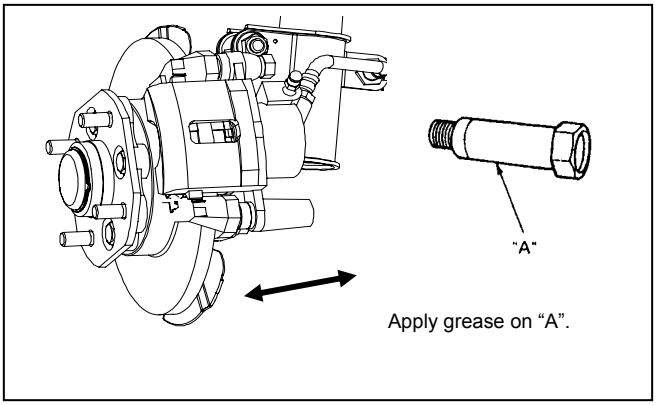
- **In height, face B of the dust guard equals face A of the brake caliper.**

（6）Inset the piston into the inner of brake caliper with hands.

（7）Install the jump ring of dust guard, and fix it firmly.

（8）Connect the brake caliper to the brake hoses.

（9）Apply grease on the guide bar and the locating rod, and then mount the brake caliper in the supporting frame.

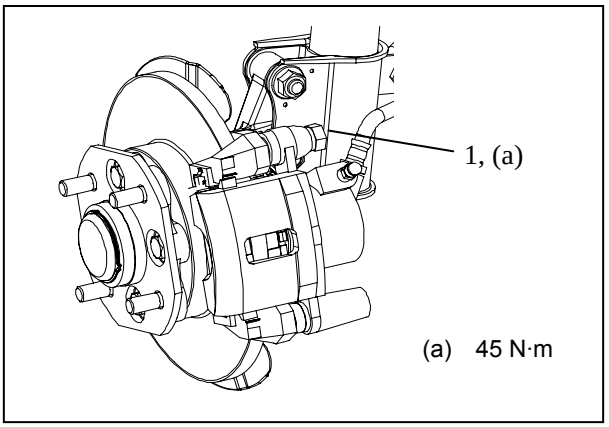


（10）Tighten the locating rod according to the specified torque.

Attention:

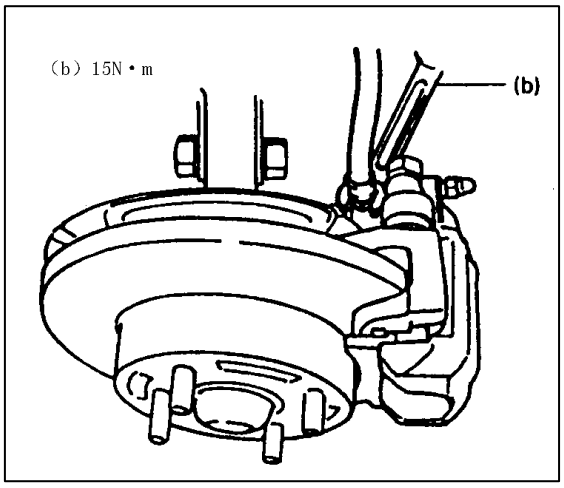
- **Make sure to install the dust cover （Ⅰ）/（Ⅱ）in the designated position.**

Tightening torque: 45N•m



（11）Tighten the bolts for brake hoses according to the specified torque.

Tightening torque: 15N•m

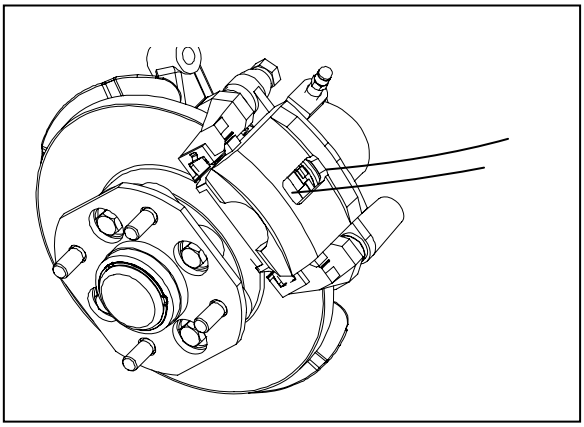


5.5.3.3 Brake Disc

Disassembly

（1）Jack up the vehicle, remove the wheels.

（2）Loosen the bolts (2 pieces) on the supporting frame, take off the brake caliper assembly, and hook the caliper body with a iron wire.

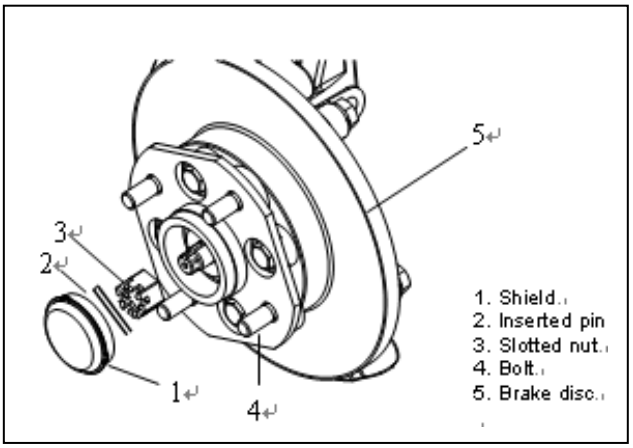


Caution:

- **Take care not to damage brake hoses and never step on brake pedal during the process of disassembly.**

（3）Remove the shield, unfix the inserted pin, remove the slotted nut, loosen the construction bolts (4 pieces) for hub to take off the hub.

（4）Take off the brake disc.



Checking

Refer to the above-mentioned contents regarding the check of brake disc.

Installation

（1）Install the brake disc in the hub.

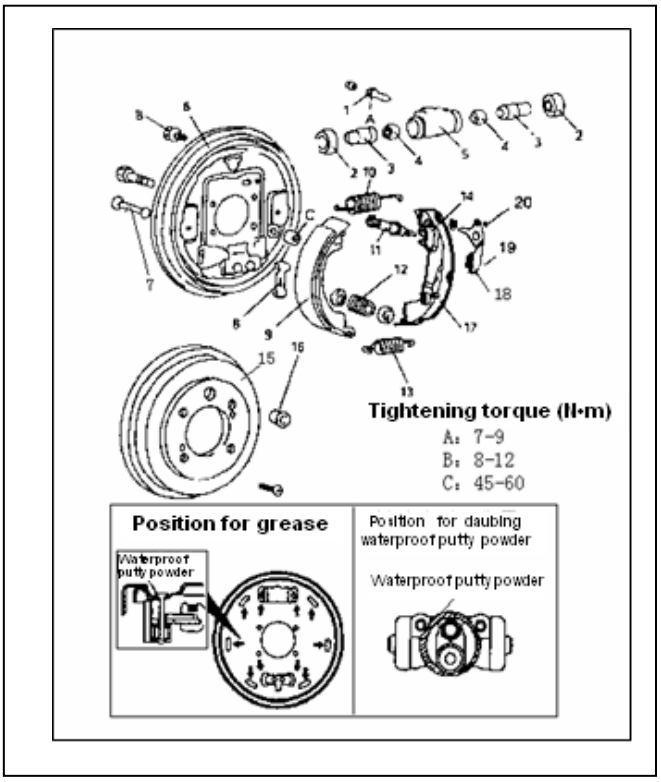
（2）Install the brake caliper assembly in the steering knuckle.

（3）Tighten the bolts on the supporting frame according to the specified torque.

5.6 Rear Wheel Brake

5.6.1 Specifications

Type: Drum type (leading and trailing shoe
Internal diameter of brake drum (mm): 220
Dimension of brake shoe (mm) (chord length x width x thickness): 176x40x5
Internal diameter of rear-wheel brake cylinder (mm): 20.64
Clearance adjusting method: Hand-brake drive automatic adjustment



5.6.2 Rear Brake with Clearance Self-adjusting Device

The structure decomposition of rear brake and clearance self-adjusting device is shown as the right figure:

1. Bleed Screw 2. Dust Guard of Rear-wheel Cylinder 3. Rear-wheel Cylinder Piston 4. Rear-wheel Cylinder Cup Ring 5. Rear-wheel Cylinder 6. Soleplate of Rear Brake 7. Spring Seat Post 8. Pinchcock 9. Leading Shoe of Rear Brake 10. Return Spring of Brake Shoe 11. Clearance Adjustable Bolt and Solenoid 12. Seatback Spring of Brake Shoe 13. Small Spring of Rear-brake Shoe 14. Hand-brake Lever 15. Rear Brake Drum 16. Rubber Plug 17. Rear Brake Trailing Shoe 18. Paddle Shift 19. Compression Spring 20. Split Washer

Attention:

● Daub waterproof putty powder at the graphic position when installing all spare parts of brake.

5.6.3 Maintenance Guide

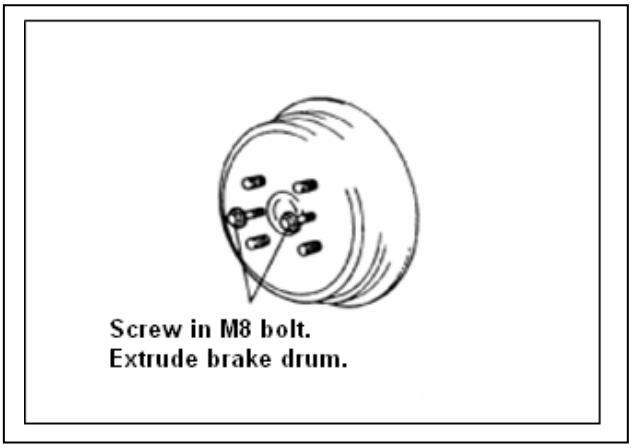
5.6.3.1 Brake Drum

Disassembly

1) Guarantee that the vehicle can reliably stop when disassembling brake;

2) Jack up (hoist) the vehicle and disassemble rear wheels;

3）Disassemble rear brake drum. If it is difficult to disassemble rear brake drum, extrude the drum by screwing M8 bolt in the screw of brake drum.



Checking

1) Cleaning: Ensure cleanness but no sundries of brake drum after being disassembled and any oil stain can not be left on the working face of brake drum.

2) Internal diameter: 220mm as standard value, 222mm as ultimate value; and you should replace brake drum if more than the ultimate value.

3) Other defects: Replace the brake drum in time if any crack or damage; aggravate the damage of brake lining if the brake drum has any serious scrape or scratch, under the circumstances, do not continue using the brake drum and they must be replaced.

Installation

1) Clean out the dunghill and oil stain in the brake drum;

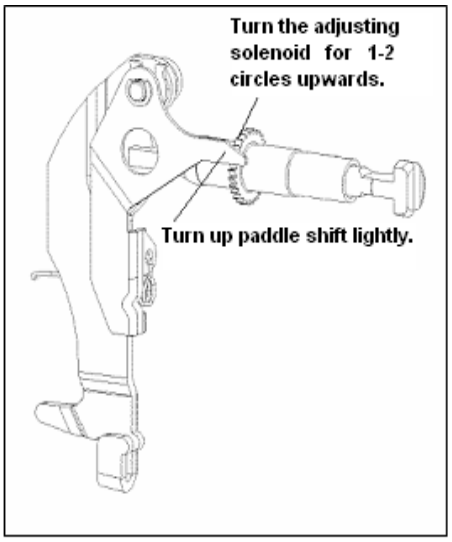
2) Adjust external diameter of rear-brake shoe; uplift the adjusting paddle shift to make it deviate the adjusting solenoid, and then turn the adjusting solenoid upwards (external diameter shortens) or downwards (external diameter enlarges), and until light contact when assembling brake drum and brake shoe, and turn the adjusting solenoid for 1-2 circles upwards.

3) Install the brake drum (place M8 screw at two sides with larger half shaft flange) in order to screw in M8 bolt for extruding the brake drum;

4) Install rear wheel (tightening torque of wheel nut: 88-108N.m);

5) Adjust the clearance of rear brake (See the adjustment on clearance of rear brake);

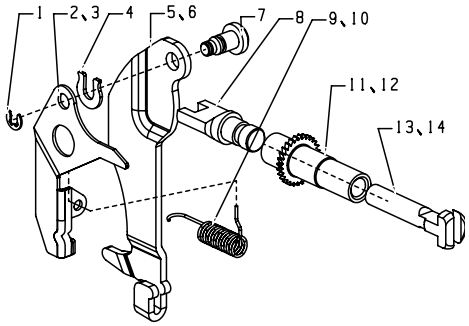
6) Adjust the parking brake travel (see the adjustment of parking brake travel).



5.6.3.2 Brake Shoe, Parking Brake Lever and Clearance Self-adjusting Device

Disassembly

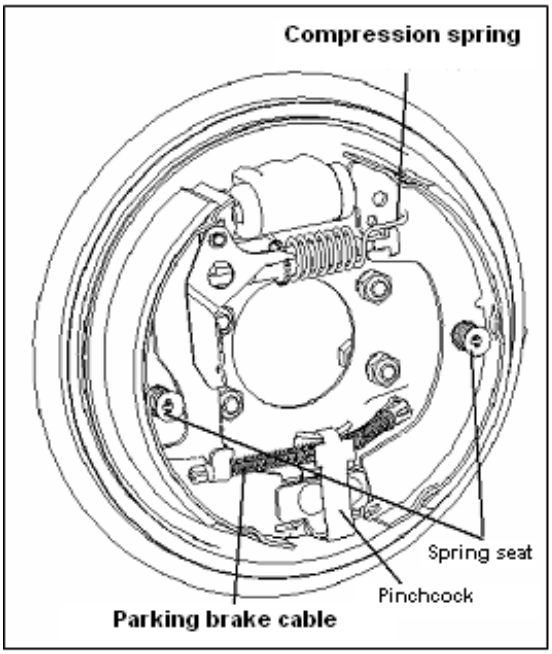
1) Disassemble the brake drum (according to the disassembly step of brake drum);
2) Disassemble one end of return spring from brake shoe hole;
3) Take off pinchcock;
4) Depress down the spring seat with forceps, and then take it out after circumvolving 90 degree;
5) Take the brake shoe out from piston ring groove of wheel cylinder;
6) Take off small spring at the bottom connecting two brake shoes;
7) Take off the parking brake cable and take down the brake shoe;
8) Take out split washer 5 (small) with forceps;
9) Take the paddle shift out from axis pin, and take off the compression spring;
10) Take off split washer (big) with forceps (enlarge the split firstly);
11) Take off the parking brake lever from axis pin;
12) Knock the axis pin out on the brake shoe.



1. Split washer 5 4. Split washer
7. Axis pin 9.10. Compression spring

Checking

1) The brake shoe lining can not have any oil stain, otherwise, the performance of brake will be influenced seriously;
2) The thickness of lining should not be less than 1 mm, otherwise, the brake shoe will be replaced;
3) The brake shoe lining should be replaced if any deformation or desquamation;
4) The spring should be replaced if any failure or partial failure;
5) The split washer should be replaced after disassembled;
6) The clearance self-adjusting device should be replaced if it can not work.



Attention:

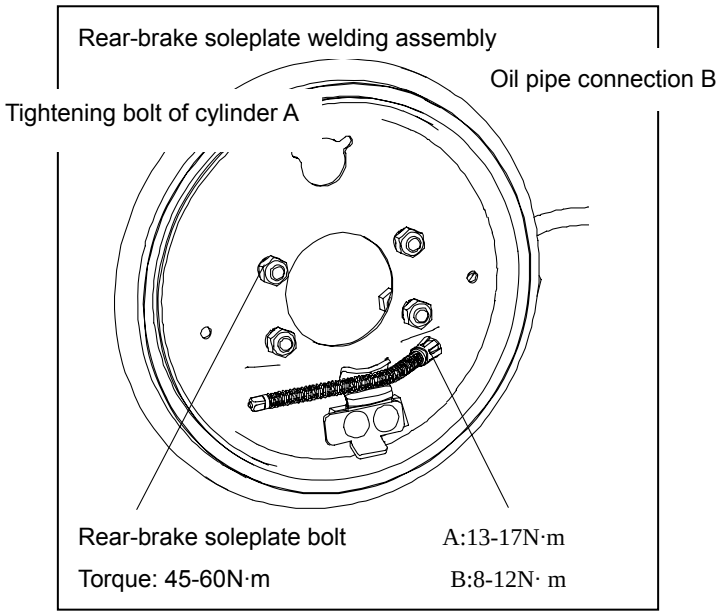
- **If some brake shoe needs to be replaced, the brake shoes of left and right brakes should be replaced in pair at the same time.**

Installation:

1) Before installation, carefully inspect all parts and ensure no any defects for use;

2) Install brake shoe, parking brake lever and clearance self-adjusting device in the order reverse to the disassembly steps of brake shoe, parking brake lever and clearance self-adjusting device.

3) Install brake drum (install it according to the above-mentioned installation steps of brake drum and adjust rear-brake clearance); (See the followings for method)



5.6.3.3 Rear-wheel Brake Cylinder Assembly

Disassembly

1) Disassemble brake drum (according to the above-mentioned steps);

2) Disassemble brake shoe, parking brake lever and clearance self-adjusting device (according to the above-mentioned steps);

3) Loosen the brake oil pipe joint, and plug up oil outlet;

4) Disassemble the bolt of brake cylinder, and take off wheel cylinder.

5) Disassemble the bleed screw;

6) Take off the dust guard;

7) Draw out piston from cylinder block;

8) Take off cup ring from piston;

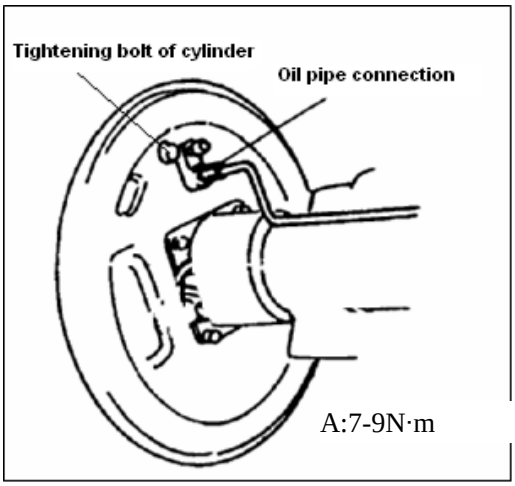
Checking

1) Measure the clearance between piston and cylinder block, when the clearance exceeds the limit value, which will result in bad seal of wheel cylinder and arouse leakage, so always replace it; (limit value ≤0.15mm)

2) Hairlike grinding crack is allowed on piston and cylinder block, but obvious nick will enlarge the abrasion of cup ring of brake cylinder or directly scratch the cup ring, which will result in leakage of wheel cylinder, so always replace it in time;

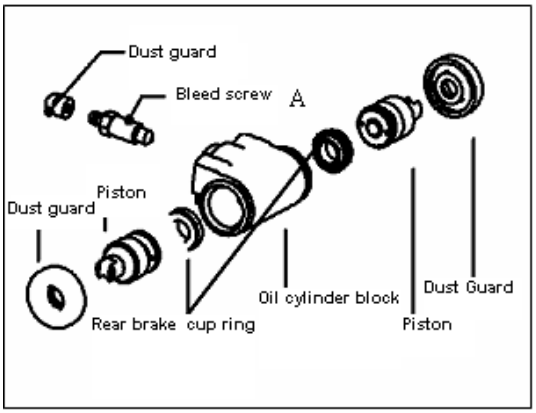
3) Inspect whether the dust guard is good or not, and replace it if any crackle;

4) Always replace the cup ring of brake cylinder once disassembled;



Attention:

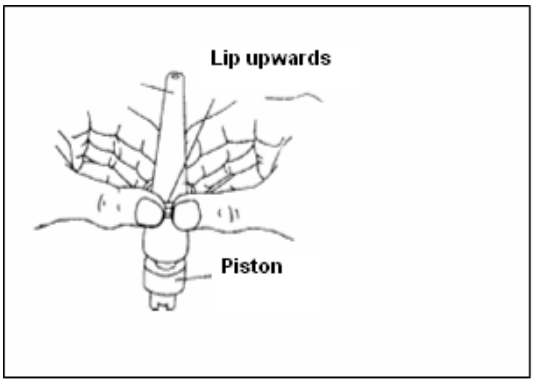
- **Leakage of any brake fluid badly influences the performance of brake, so always repair it at once;**
- **Do not dip any brake fluid and other liquid or sundries in brake cylinder and its spare parts, type of which is different from that of the brake fluid used for the vehicle.**



Installation

1) Install all spare parts in the order reverse to the disassembly steps of rear-wheel brake cylinder assembly;

2) Exhaust the air in the pipeline and cylinder according to the exhaust method of brake pipeline.



Attention:

- **Install the cup ring of rear-wheel brake cylinder with special cone tools, daub brake fluid on the contact surface between special tools and piston, and slide the cup ring onto piston slowly, evenly and continuously.**

5.6.3.4 Rear-brake Soleplate Welding Assembly

Disassembly

1) Disassemble brake drum (according to the above-mentioned steps);
2) Disassemble brake shoe, parking brake lever and clearance self-adjusting device (according to the above-mentioned steps);
3) Disassemble rear-wheel brake cylinder assembly (according to the above-mentioned steps);
4) Disconnect the connection between the parking brake cable and brake soleplate;
5) Disassemble half-shaft assembly (according to the disassembly method of half-shaft assembly);
6) Disassembly bolt of rear-brake soleplate;

Attention:

- **Adjust hand-brake stroke after the completion of rear-brake clearance adjustment.**

Installation

Install all spare parts in the order reverse to the disassembly steps of rear-brake soleplate welding assembly;

5.6.3.5 Rear-brake Clearance Adjustment

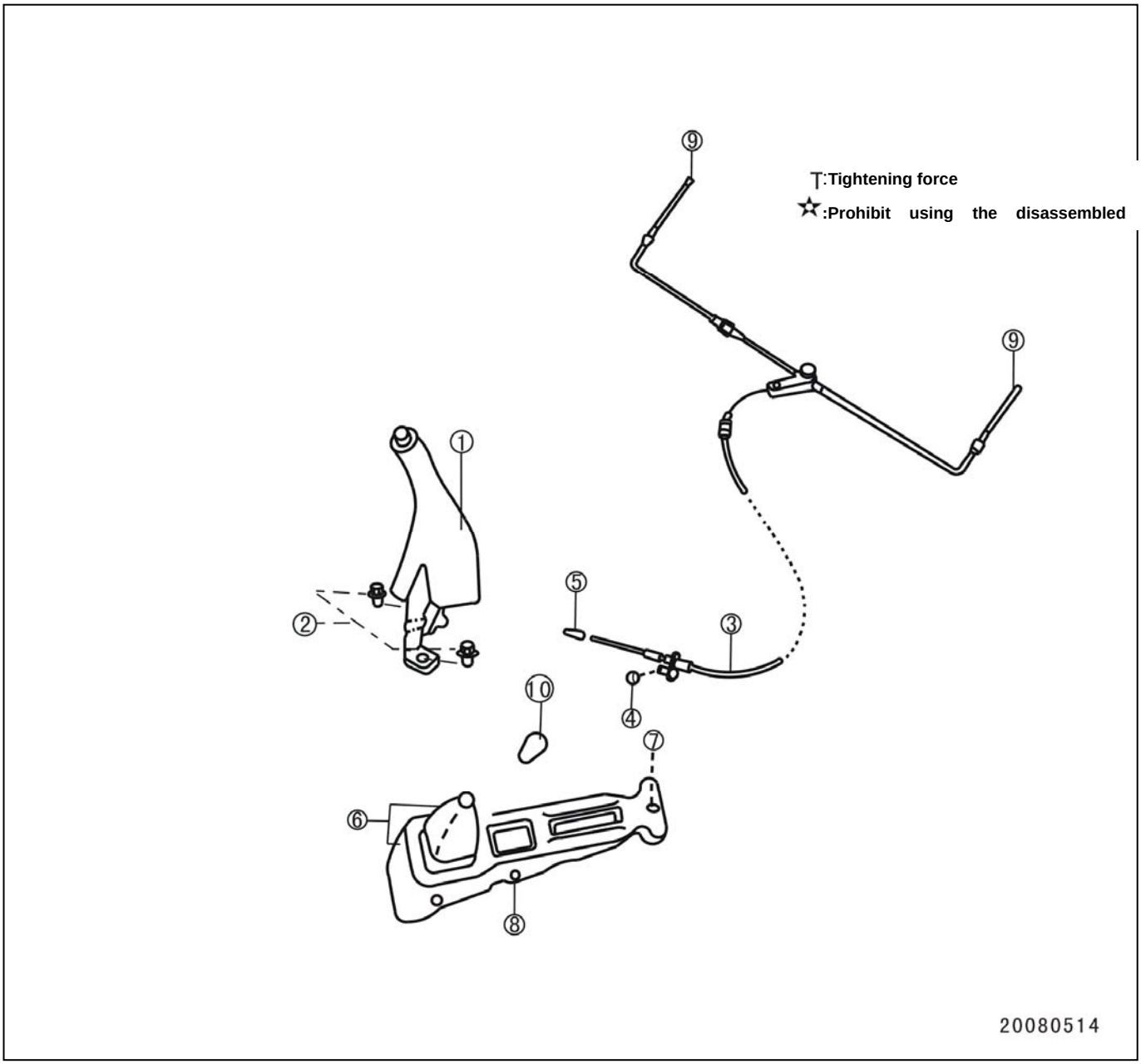
When disassemble and installation of rear brake, its clearance has been enlarged (convenient to install), and the rear-brake clearance should be adjusted again.

Pull the parking binding handle with 400N force (at this time, the stroke of the handle should be more than 9 teeth, otherwise, the stroke of the handle should be enlarged), and then release the handle (at this time, the adjusting device should make a noise of adjustment, otherwise, the self-adjusting device will be out of service and should be replaced), repeat doing like this (step on the brake pedal for many times during this period for full pullback of brake shoe) until the adjusting device make no noise again, then the adjustment is completed.

During general use of vehicle, rear brake clearance can pass hand-brake automatic adjustment, and manual adjustment has no need.

5.7 Parking Brake Control Device

Parking brake lever



1. Binding handle 3. Parking brake cable assembly
4. Nut 5. Nut 6. Auxiliary instrument decoration plate assembly
9. Hand-brake cable end joint
Moment at ②: 10~15 N·m
Moment at ④: 3~7 N·m

Adjustment of Parking Brake:

After the assembly completion of rear-brake assembly, clearance self-adjusting device and hand-brake cable, connect the hand-brake control device with hand-brake cable according to the hand-brake connection status, adjust the stoke of the handle to the scope of 7-10 tooth, pull the hand brake time after time, until that the clearance adjustment of left/right rear-brake assembly is over, namely, the clearance self-adjusting device does not make a noise again (the operating force of the handle is 400-500N).

5.8 Failure Diagnosis

5.8.1 Inspection Table for Brake System

Steps	Operation	Normal Results	Abnormal Results
1	Check the fluid-level height of brake fluid in brake fluid reservoir.	The fluid-level height of brake fluid is normal.	The fluid-level height of brake fluid is too low.
2	Step on the brake pedal to the maximum extent.	1. The brake pedal stably moves to floor. 2. The brake pedal stops and withstands pressure.	1 The brake pedal moves unstably. 2. The brake pedal is too soft.
3	Loosen brake pedal.	The brake pedal returns to original position.	The brake pedal does not return to original position.
4	Test brake system.	1. Brake action is produced immediately when stepping on the brake pedal. 2.The operation of brake is stable and normal, without clamping phenomenon, and the brake pedal does not librate. 3. Steering wheel and brake pedal do not librate when stepping on brake pedal. 4. If the vehicle does not pull to one side when the brakes are applied. 5. Rear and front brakes work at the same time. 6.There is no too large noise when the brakes work. 7. The brakes do not drag when loosening the brake pedal.	1. The brake action will lag after stepping on the brake. 2. When stepping on the brake pedal lightly, the brake operates roughly. 3. When stepping on the brake pedal, the live brake pedal of steering wheel wobbles. 4. If the vehicle pulls to one side when the brakes are applied. 5. Front brake or rear brake does not operate evenly. 6. There is noise when the brakes are applied. 7. The brake drags when loosening the brake pedal.
1. For checking correct test result, if possible, compare the test result with that of the same type of vehicle/system being operated. 2. Please refer to relevant failure diagnosis table for the operation results.			

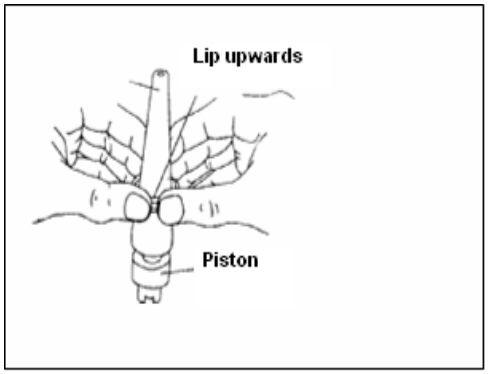
5.8.2 Failure Diagnosis Table of Brake System

Failure Phenomenon	Reasons	Solution Method
The brake pedal is too low or too soft	Friction wafer wears. Oil of brake system leaks. There is failure on brake master cylinder. Air is mixed into brake hydraulic system. There is failure on brake wheel cylinder. There is failure on rear-wheel brake self-adjusting device.	Replace the brake shoe or brake boot. Find out the oil leakage part and maintain. Repair or replace the brake master cylinder. Exhaust the air from the brake hydraulic system. Repair the brake wheel cylinder. Repair or replace self-adjusting device.
Brake drags	The parking brake is misadjusted. Length of handspike assembly is misadjusted. The return spring of rear brake is misadjusted. Brake hydraulic pipeline blocks up, not smooth. Brake wheel cylinder or brake-caliper piston blocks. Brake master cylinder has failure.	Adjust the parking brake. Adjust the length of handspike assembly. Replace the return spring. Repair according to need. Repair according to need. Repair or replace the brake master cylinder.
Insufficient brake force	Inappropriate pressure in tire. There is oil stain or lubricating grease on friction wafer. Brake shoe deforms or friction wafer replaces smooth because of abrasion. Brake drum or brake disc is out of roundness. Brake wheel cylinder has failure. There is oil leakage phenomenon in brake system. Brake master cylinder has failure.	Charge the pressure of tire appropriately. Replace brake shoe. Replace brake shoe. Replace brake drum or brake disc. Repair or replace the brake wheel cylinder.
Uneven brake force	There is oil stain or lubricating grease on friction wafer. The self-adjusting device of rear-wheel brake has failure. Brake drum or brake disc is out of roundness. Uneven air pressure in tire. The brake wheel cylinder has failure.	Replace brake shoe. Repair or replace the self-adjusting device. Replace brake drum or brake disc. Even air pressure in tire. Repair or replace the brake wheel cylinder.
The brake pedal is hard but the brake effect.	There is oil stain or lubricating grease on friction wafer. Brake shoe deforms or the friction wafer changes smooth because of abrasion. Piston of brake caliper and the brake caliper mutually congeals. Brake hydraulic pipeline blocks up, not smooth.	Repair or replace the brake shoe. Replace the brake shoe. Replace the brake caliper. Repair according to need.
Parking brake warning light is on during drive.	The parking Binding handle does not fully set down. The circuit of parking brake light has failure.	Set down the parking binding handle. Replace or repair according to need.
Brake fluid level warning light is on.	Insufficient brake fluid	Add corresponding brake fluid according to the scale merit of brake fluid reservoir.

5.8.3 Special Tools

1) Installation tools for the piston cup ring of rear-wheel brake Cylinder:

The operation method is shown as the figure:



Chapter 6 Dynamical System

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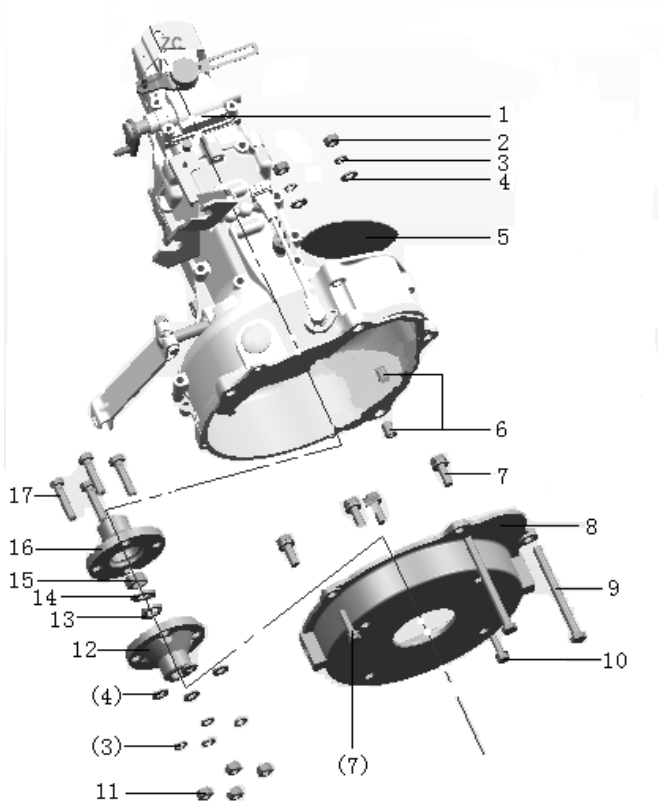
6.1 Connection Assembly of Electric Motor and Transmission

6.1.1 Specifications

Connection assembly of electric motor and transmission is composed mainly of the parts as below:

NO.	Figure No.	Name
1	EP1102-001	Transmission assembly
2	EP1102-10001	Coupling plate
3	EP1102-10002	Connecting plate
4	V1102-10001	Coupling plate Ⅱ

6.1.2 Tightening Torque Required for Connection Assembly of Electric Motor and Transmission



All parts and tightening torque in the figure:

No.	Name	(N·m) Tightening torque(N·m)
1	Transmission assembly	
2	Nut M10×1.25	45～65
3	Washer 10	
4	Washer 10	
5	Motor baffle plate	
6	Dowel pin of cylinder head	
7	Bolt assembly M10×1.25×30	45～65
8	Connecting plate	
9	Bolt M10×1.25×120	45～65
10	Bolt assembly M10X1.25×45	45～65
11	Locknut M10×1.25	45～65
12	Coupling plate Ⅱ	
13	Washer 16	
14	Washer 16	
15	Hex nut M16X1.5	120～140
16	Coupling plate	
17	Bolt for coupling plate	45～65

6.1.3 Maintenance Guide

During periodic maintenance service, always check the parts for connection assembly of electric motor and transmission according to the following methods:

Check that the bolts and the nuts on the joints become loose, were this to happen, tighten them according the specified torque.

Check that the spline in the coupling plate is badly worn, were this to happen, replace the coupling plate.

Carry out general maintenance for the connection assembly of electric motor and transmission according to the following steps:

·Loosen four bolts on the connecting plate; remove the electric motor together with the connecting plate.

·Loosen four bolts on the coupling plate, remove the coupling plate, if difficult to remove, do it after vibrating slightly with a wooden hammer.

·Loosen the hex nuts, remove the coupling plate Ⅱ.

·Loosen four bolt assemblies that connect the connecting plate and the electric motor so as to remove the connecting plate.

·Check that the splines and the flat keys in the coupling plate are worn and replace them if necessary.

· When reinstalling, tighten the bolts and the nuts according to the specified torque.

·After installation, start the electric motor, check if there is abnormal knocking.

6.2 Suspension System Assembly of Electric Motor and Transmission

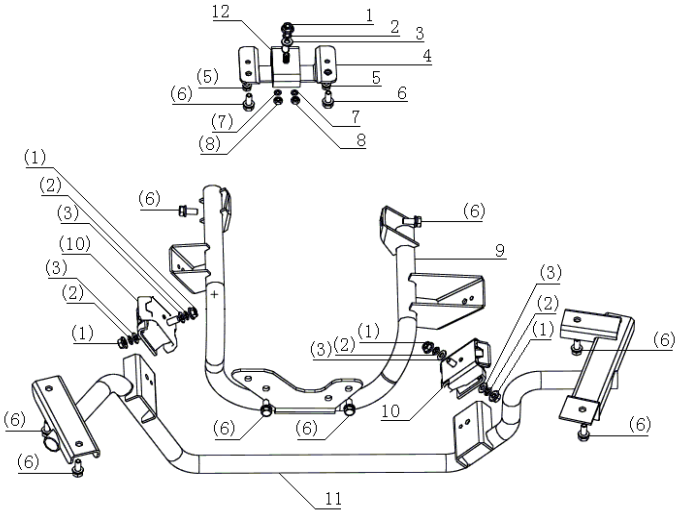
6.2.1 Description

Suspension system assembly of electric motor and transmission is composed of electric motor mounting bracket, forward mounting welded assembly of electric motor, suspension soft pad assembly, rear suspension plate, and rear support glued-laminated member, etc..

6.2.2 Tightening Torque Required for Suspension System Assembly of Electric Motor and Transmission

All parts and tightening torque in the figure:

No.	Name	Tightening torque(N·m)
1	Nut M10×1.25	55～60
2	Washer 10	
3	Washer 10	
4	Rear suspension plate	
5	Bolt assembly M8×25	25～30
6	Bolt assembly M10×1.25×25	55～60
7	Washer 10	
8	Nut M8	25～30
9	Electric motor mounting bracket welded assembly	
10	Suspension soft pad assembly	
11	Forward mounting welded assembly of electric motor	
12	Rear support glued-laminated member	



Suspension System of Electric Motor and Transmission

6.2.3 Maintenance Guide

When periodic maintenance, always check the parts for suspension system assembly of electric motor and transmission according to the following methods:

· Check the forward mounting welded assembly of electric motor and the electric motor mounting bracket, if they are cracks and contortions, do not use them and replace them with new ones.

Check each connecting piece for bolts; tighten them if they become loose. Besides, replace them with new ones if they are incapable of tightening.

Chapter 7 Accelerator Assembly and Transmission Assembly

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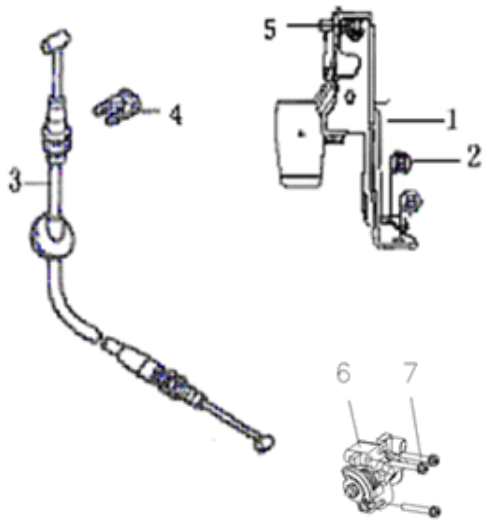
7.1 Accelerator Assembly

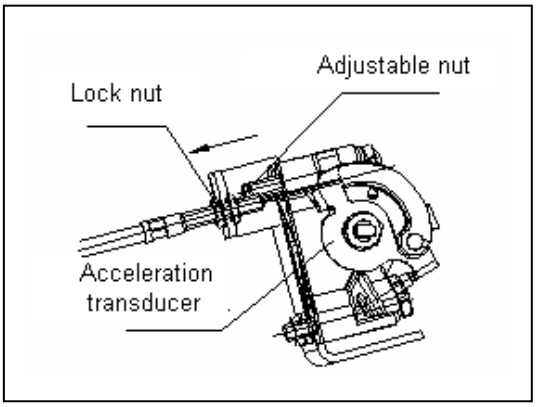


1. Accelerator pedal module
2. Bolt assembly M8 × 16
3. Accelerator cable assembly
4. Jump ring
5. Return spring
6. Acceleration transducer assembly
7. Bolt Assembly M6 × 45

Maintenance Guide

• Check that the wire ropes，if they are damaged and cracked, replace them in time.

•Rotate the adjustable nut and push the wiring hardness shell until the turnplate of the acceleration transducer assembly is about to rotate according to the direction of the arrow shown in the figure. Then screw the adjustable nut one circle back (screw one circle in a clockwise direction according to the position shown in the figure), and lock the adjustable nut tightly with the lock nut.

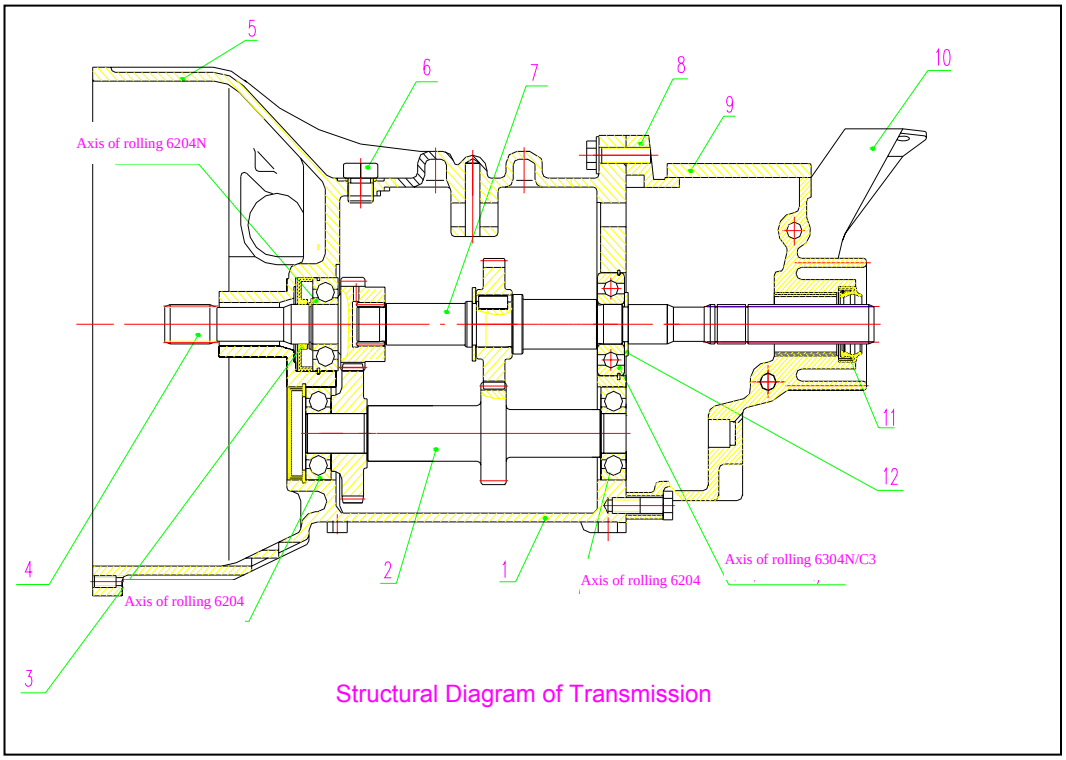


7.2 Transmission Assembly

Assembling transmission is mechanical fixed speed ratio (its total transmission ratio is 2.1091), whose structure is shown in the figure as below:

1. Lower box 2. Countershaft unit 3. Input shaft sealing ring assembly
4. Input shaft 5. Upper box 6. Plug of reversing lamp 7. Output shaft module
8. Extension housing 9. Shifting box cover 10. Rear overhang
11. Output shaft sealing ring assembly 12. Closing ring

The transmission has no gear position and connects to ED150 motor; reducing the output speed of the motor is equivalent to a deceleration mechanism.



Structural Diagram of Transmission

Maintenance Guide

◆ **Disassembly**

· Disassemble the connecting bolts of the transmission extension housing and the rear housing upper box on the upper box, and then remove the extension housing assembly.

· Disassemble the connecting bolts on the extension housing to remove the extension housing assembly.

· Disassemble the connecting bolts of the upper and lower box to remove the upper and lower box assembly, and then remove the input shaft module and output shaft module assembly.

· Remove the reverse check plate, disassemble the sealing ring assembly at the front-end of the countershaft, and dismantle φ47 bearing retainer ring. Strike the housing washer of countershaft front bearing from front to back with a copper rod and a hammer to make the front and rear bearings rush out from the inner of the dead eye on the lower box. Remove the rear bearings with a shaft bearing replacer, and take off the countershaft unit.

· Take off the sealing ring assembly on the input shaft, remove the retainer ring on the input shaft with a circlip pliers, and then disassemble the input shaft module. When disassembling, always pay attention not to damaging each gear of the input shaft due to collision, and take notice of assembly relationship between each adjacent component. When installing, do not allow to install bearings（6204N）on the Input shaft in wrong direction.

· Remove the closing ring on the output shaft with a circlip pliers, disassemble rear bearings（6304N/C3）of the output shaft with a shaft bearing replacer, remove the E-type adjustable closing ring on the output shaft with a circlip pliers. Because it is a larger magnitude of interference fit between the drive gear on the output shaft and the output shaft, always need to use special tools to withdraw drive gear on the output shaft to disassemble the output shaft module. When disassembling, always pay attention not to damaging each gear of the output shaft due to collision, and take notice of assembly relationship between each adjacent component. When installing, do not allow to install bearings（6304N/C3）on the output shaft in wrong direction.

During the procedure of the above-mentioned disassembly, mainly pay attention not to damaging each gear wheel due to collision.

◆ **Check and Repair**

·Check that the tooth surface of each gear wheel is worn or damaged and ensure to replace them when their tooth surfaces have defects.

·Check that each bearing is worn or damaged. Always replace the bearings when they have defects.

·Check that the gear wheels of the countershaft are worn or its teeth are broken off. The countershaft must be replaced when the gear wheels lose efficacy.

· Check the tooth surface of splines and gear wheels on the input shaft. If there are defects in any parts of the above-mentioned input shaft, always replace them in time.

· Check that the transmission extension housing and the bushing pressed into the extension housing are damaged, measure the diametral clearance between the bushing and the universal-joint splined shaft yoke of transmission shaft; its normal clearance is 0.02 - 0.06 mm, and its serviceability limit is 0.1mm. If the clearance exceeds its serviceability limit, it can make the splined shaft yoke rock in the bushing so that vibration of the transmission shaft is caused, at that time, not only the bushing must be replaced but also the extension housing pressed assembly.

· Check that each bearing is worn, were this to happen, always replace it in time.

◆ **Installation**

The installation procedures of the transmission are contrary to its disassembly procedures.

· All parts used in the installation of transmission must be cleaned.

· Before installation, apply machine oil of transmission on the parts with slide and friction surface inside the transmission.

· Before the input shaft module and the output shaft module are installed in the lower box of transmission, locating jump ring of bearing and dowel pin for box should be installed in the lower box of transmission firstly.

·When assembling each shell of the transmission, clean junction surface of each box at first, apply a layer of sealant on the junction surface evenly, after a few minutes, fit each box together. After aligning the boxes, tighten each fastening bolt evenly in proper order, pay attention to using even force to tighten them.

Chapter 8 Body

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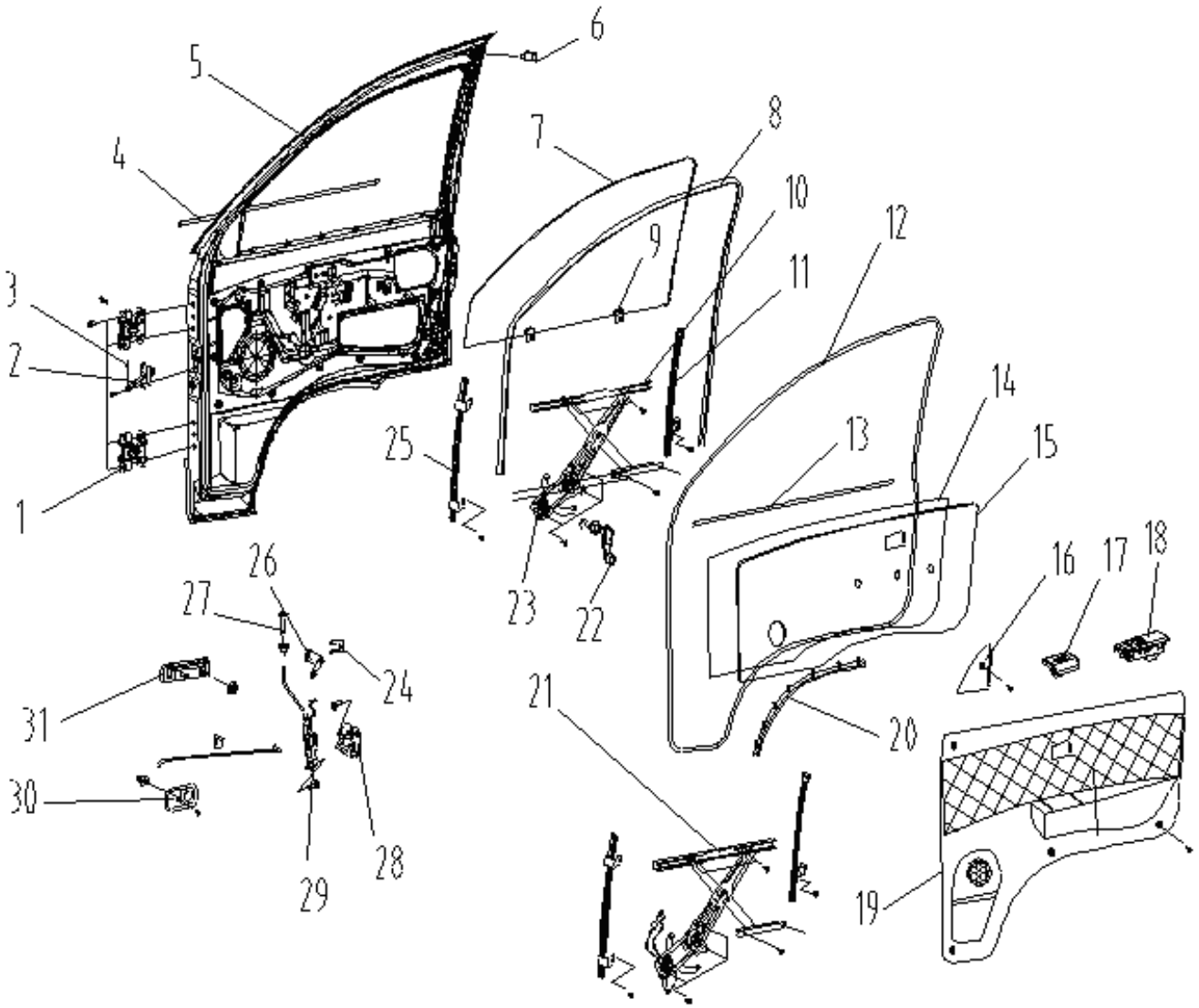
8.1 Front Door Assembly



1. Front door hinge
2. Front door check unit
3. Pin roll
4. Front door middle rubber strip
5. Front door welding assembly
6. Cushioning rubber plug
7. Front door glass
8. Rubber strip of front door glass
9. Plastic nut
10. Glass channel
11. Rear lower guide rail of front door
12. Front door weather rubber strip
13. Front door middle inner rubber strip
14. Front door waterproof film
15. Interior trimming panel of front door
16. Angle trimming panel of front door
17. Right switch on automatic regulator
18. Left switch on automatic regulator
19. Interior panel of front door
20. Rubber strip of front door rim
21. Automatic window regulator of front door
22. Front door regulator handle
23. Front door window regulator
24. Lock core insert
25. Front lower guide rail of front door
26. Front door lock core
27. Inner lock button
28. Front door buckle
29. Front door lock mains
30. Front door inner handle
31. Front door lock outer handle

8.1.1 Disassembly and Assembly of Front Door Lock

Disassembly

1）Lift up window glass to limit.

2）Take off the regulator handle of front door window.

Remove the door inner handle cover.

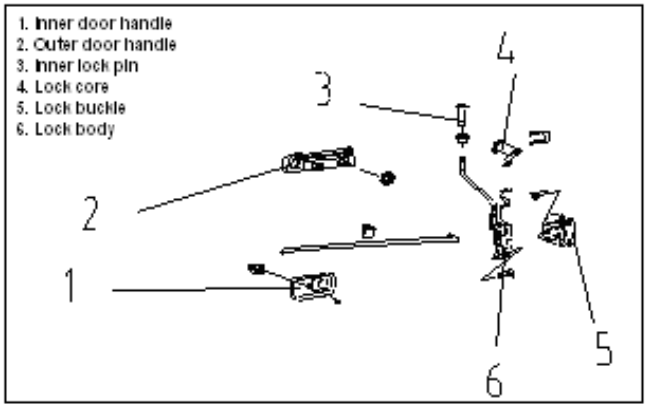
Remove the door handle.

Remove the door decorative subassemblies and clamps.

Take off the waterproof film.

Take off the front door inner handle.

3）Take off all joints of control levers and then remove the outer handle and lock assembly.



Assembly

Install the front lock according to the steps below:

1） Install the lock subassembly and the outer handle, and then connect all joints of control lever.

2） Install the inner handle and fix the lever.

3） Attach the waterproof film.

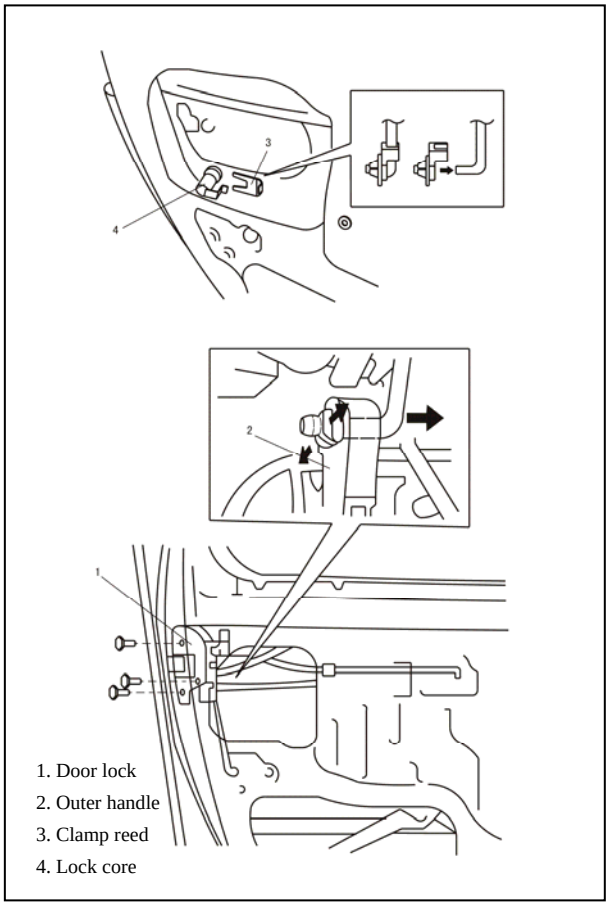
4） Install decorative panel subassembly and clamps.

5） Install the door handle and the inner lock handle cover.

6） Install the window regulator handle

Pay attention to：

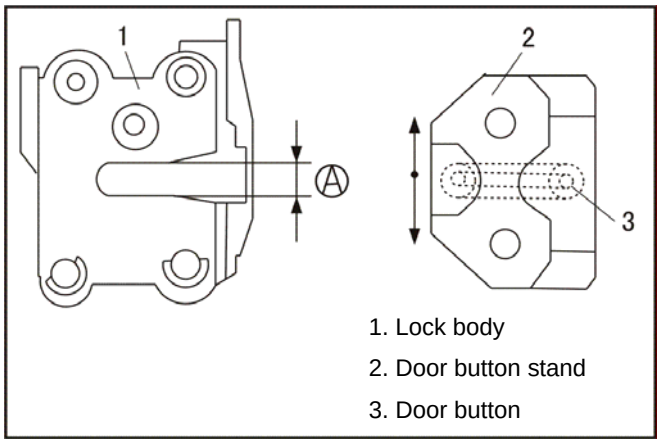
- Install the lock shackle.
  Move the lock buckle up and down to ensure it aligned with center groove A. Close the door and adjust it again and again to keep the surface of door and vehicle body level.

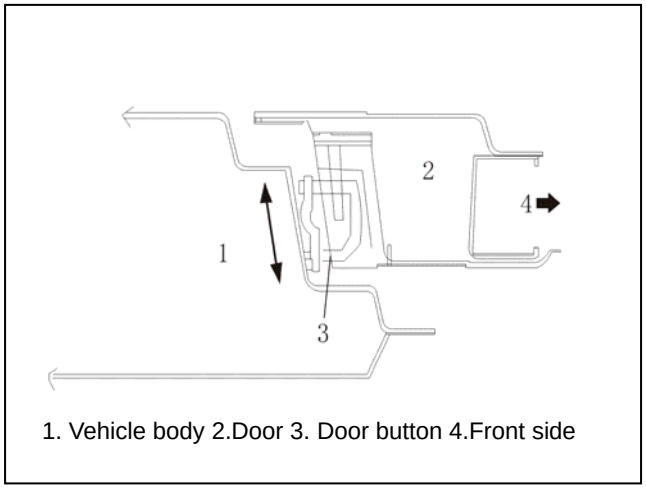


Caution

Keep the latch lateral and move it vertically. Do not adjust the lock

- Add or reduce the insert gaskets between body and lock buckle to find appropriate position of lock buckle.





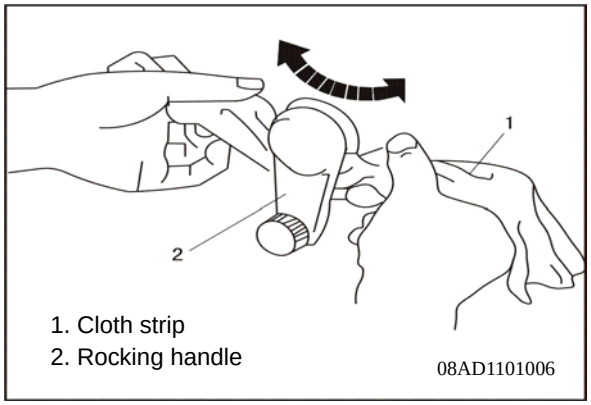
8.1.2 Front Door Glass and Window Regulator Disassembly

1）Roll down all the window glasses to limit.

2）Take off the inner and outer middle rubber trips of front door.

3）Pull out the window regulator handle of front door with a piece of cloth as shown in the figure.

4）Take off the front door handle.



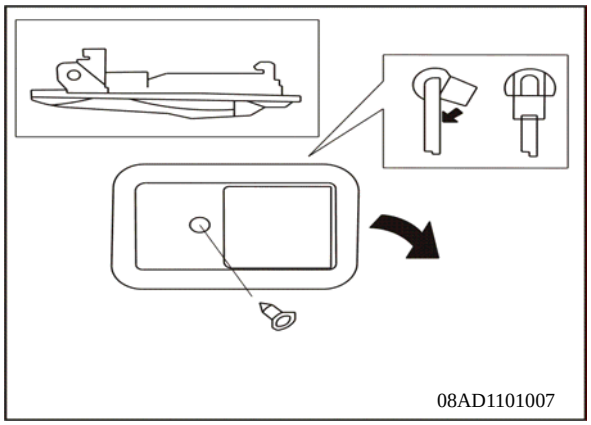
1. Cloth strip
2. Rocking handle

08AD1101006

5) Unscrew the bolts and then take off the inner handle cover by sliding dead ahead on the interior trimming panel.

6）Remove the front door decorative panel subassembly and clamps.

7）Remove the waterproof film of door.



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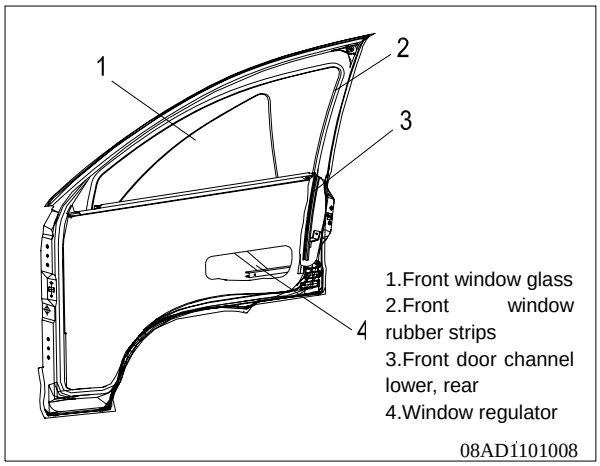
8）Screw off the setscrew of front glass channel.

9）Take off the front window glass.

10）Take off the glass channel.



1.Front window glass
2.Front window rubber strips
3.Front door channel lower, rear
4.Window regulator

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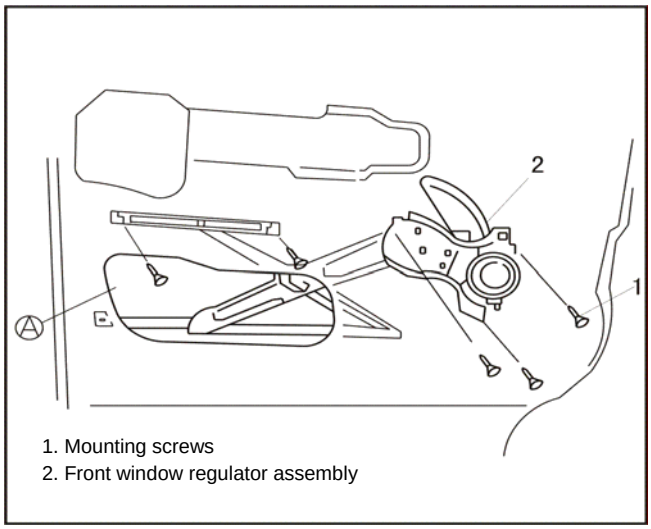
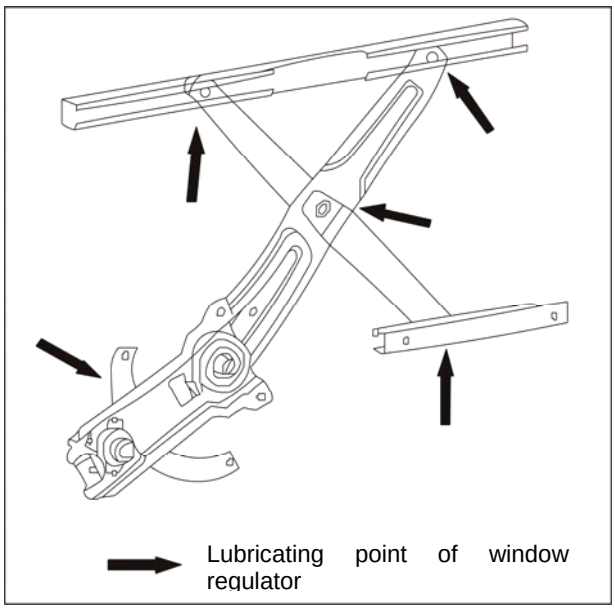
11）Screw off the five setscrews on glass regulator and then take off the glass regulator through hole A.



1. Mounting screws
2. Front window regulator assembly

Checking

- Check the lubrication status of sliding and rotating parts of glass regulation.
- Check if the glass regulator pinion is abraded or damaged.



Installation

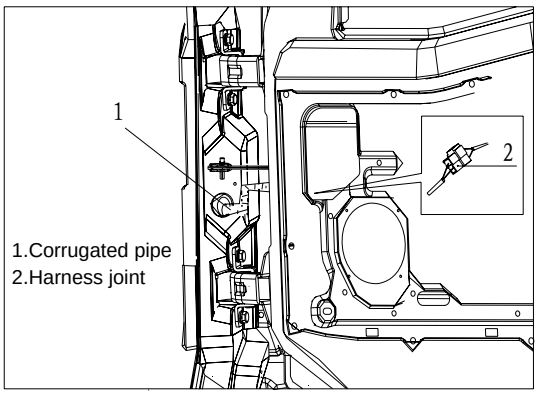
Install the front window glass and regulator according to a reverse step of the disassembly, but notice that:

- Whether the top of glass touches the inner of guide rail in front door window glass evenly and the glass fluently slides up and down when installing the grass. And then fix it with screws.
- Whether the glass regulator handle is at a 30 degree angle when the window glass is lifted up completely to the limit.

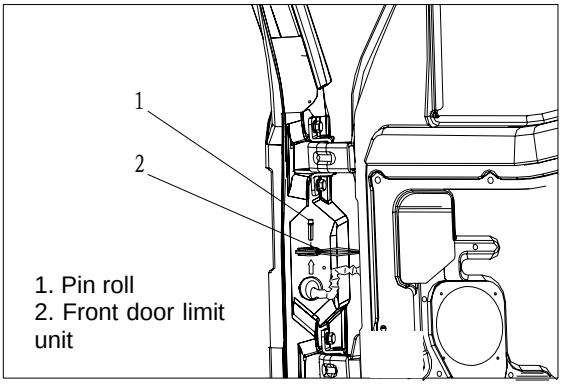
8.1.3 Disassembly, Assembly and Adjustment of Front Door

Disassembly

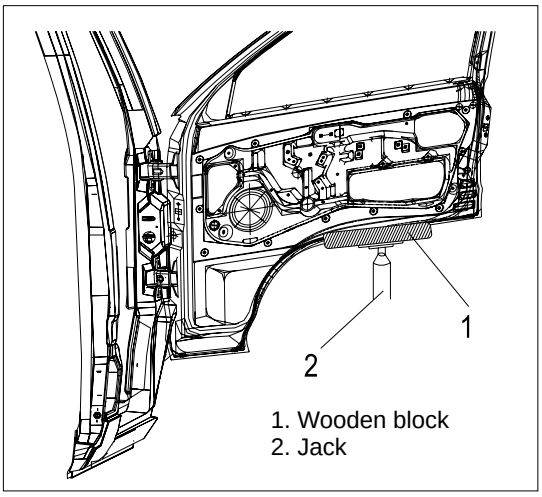
1）Remove the door harness joints at first and then take off corrugated pipe from front door.



2) Tap out the limit stop pin roll of front door



3）Sustain the front door by placing a wooden block between Jack and door inner panel.

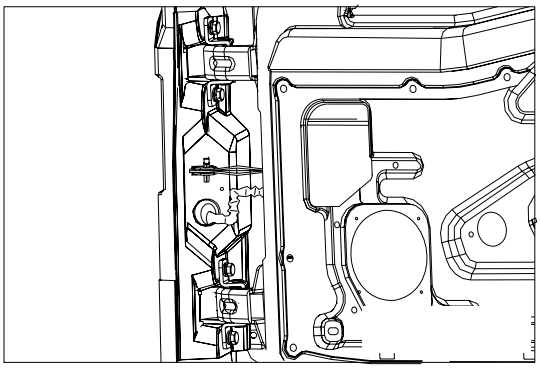


4）Unscrew the erection bolt of front door hinge and then disassemble the front door assembly.

Assembly

Install the front door in a reverse step of disassembly, such as 3）,4）,2）and 1）:

- Grease lubricant should be applied on the hinge rotating components.
- If the rubber seal is hardened, otherwise, a leakage of water may occur, were this to happen, replace it with a new one.
- Ensure door to be located appropriately by adjusting the door latch according to “Front Door Installation”.

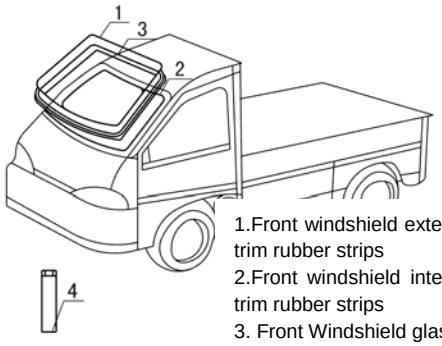


Adjustment

Unscrew the four hinge bolts on one body side and the ensure the clearance between door and the edge of door frame are even by pushing the door up and down, forward and backward.

8.2 Front Windshield

Use special glass cement for automotive windshields to install the front windshield. (I.e. Through one-component polyurethane seal matches with primer, directly adhere the windshield onto vehicle body metal plates .) When replacing the front windshield, strong-adhesion adhesives should be used according to the following correct methods:



1.Front windshield external trim rubber strips
2.Front windshield internal trim rubber strips
3. Front Windshield glass
4.Front windshield rubber

Attention:

- **Usually adhesive (One-component polyurethane seal) and two primers (or some only use a kind of common used primer) are used for replacing the windshield. Whichever to use, should comply with its user manual. Non-comply or misuse other adhesive may reduce adhesive performance. Therefore, please read the adhesive manual or instruction provided by manufacturer carefully before using. And strictly comply with defined steps and methods while repairing.**

Additionally, repair and paint the scratched or buffed surface to avoid worse corrosion.

The applied adhesive must meet the following requirements:

●Shear strength：40kg/cm^2 (569lb/in^2) or above。

●The adhesive and tools used to remove front windshield are:

- One-component polyurethane seal and primers.

The materials and volume used for installing front windshield are: Adhesive: 400ml

Glass primer: 10ml　Vehicle body primer: 10ml

- Awl
- Steel wire
- Brushes for brushing primer(two)
- Knife
- Rubber sucking disc
- Glue gun (injected with adhesive)
- Putty scraper（Scrape off viscous liquid）

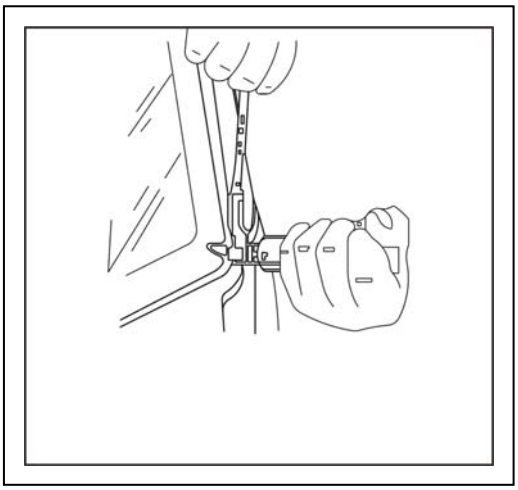
8.2.1 Disassembly

1） Clean the edge, internal and external sides of windshield.

2） Remove the wiper hose.

3） Cover the surface of vehicle body around the windshield with adhesive tape to avoid any damage.

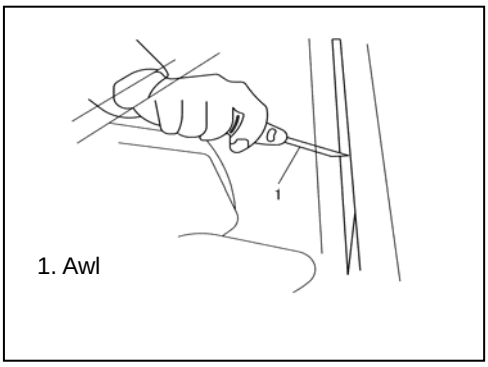
4）Remove rearview mirror, sun shield and front pillar decorative subassembly, and then take off windshield strips from R / L front pillars.



5） Cut off all strips around the windshield to show windshield edges.

6）Scrape off all adhesive around the windshield, for example, if scrape off all adhesive with steel wires, refer to the step 8) and 9):

7）Have steel wire thread through the hole on adhesive drilled by a awl.

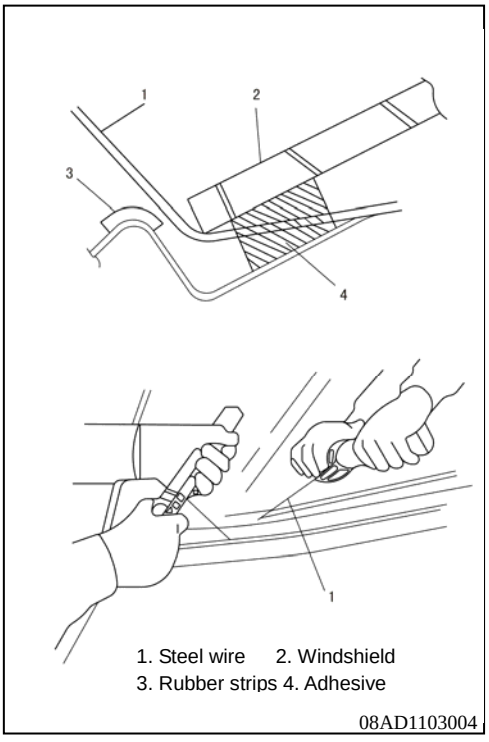


1. Awl

8） Scrape off the adhesives on the glass.

Attention:

● When using steel wire, approach the glass as much as possible to avoid damaging the vehicle body.



1. Steel wire 2. Windshield
3. Rubber strips 4. Adhesive

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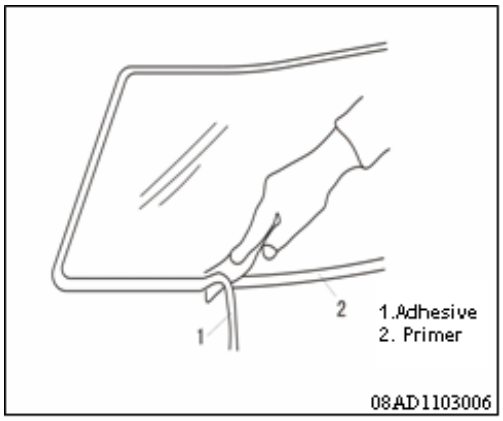
9) Smoothly scrape off remained adhesive on the vehicle body next to windshield. The inserting depth of knife shall be 1-2mm.



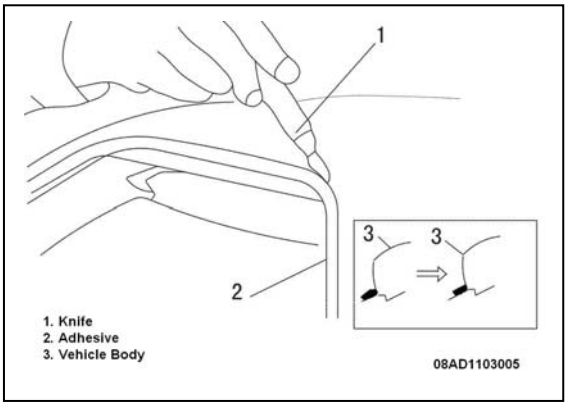
Attention:

- **Before scraping, clean the knife with ethanol or use similar method to eliminate grease dirt.**

10) Before reuse the removed windshield, remove all the strips and adhesive on it.

8.2.2 Assembly

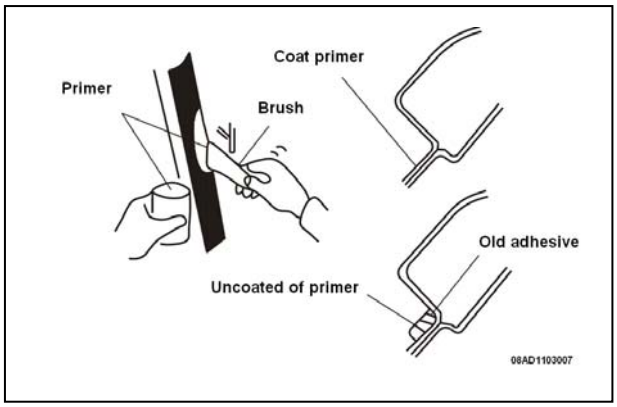
1） At the position that adheres to the windshield, remove and clean remained adhesive on the adhesive interfaced area of vehicle body (or on the edge of windshield).(Expose it at least10 minutes)



2） Fully clean the old adhered surface, paint and bare metal. Carefully brush the primer on the surface of paint or bare metal surface. Never brush the primer on the adhesive remained on the vehicle body.

Attention:

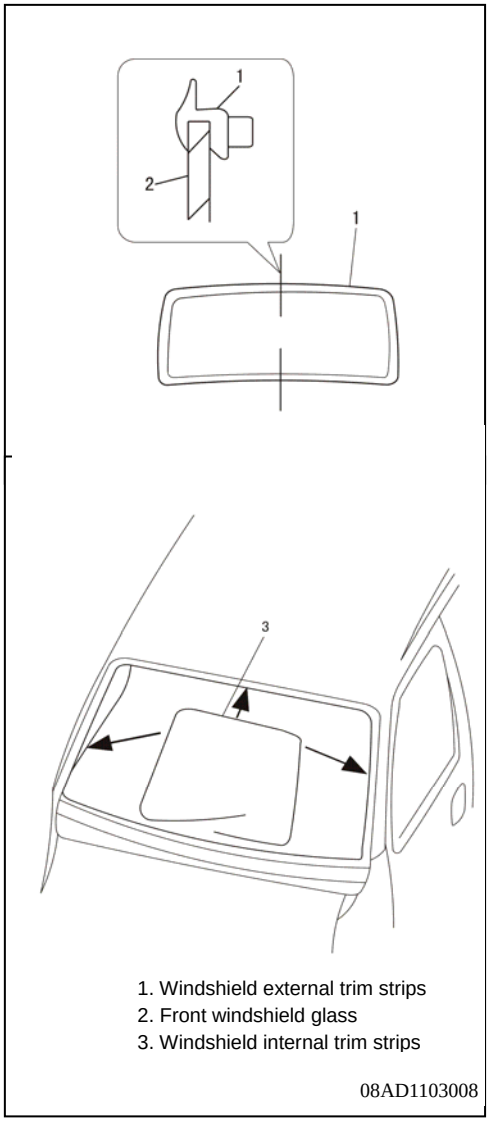
- **Comply to correct steps on instructions provided by primer manufacturer. And have them dried in required time.**
- **Do not have primer touched with old adhesive surface to which the vehicle body and glass will adhere.**



3） Embed the glass into new trim strips, which must be preheated for half an hour under 35℃（95 ℉）.

4） Clean all adhesive on the glass with a piece of clean cloth; if cleaning solution is used, have it exposed in the air for more than 10 minutes.

5）Insert windshield internal strips into front windshield frame.



1. Windshield external trim strips
2. Front windshield glass
3. Windshield internal trim strips

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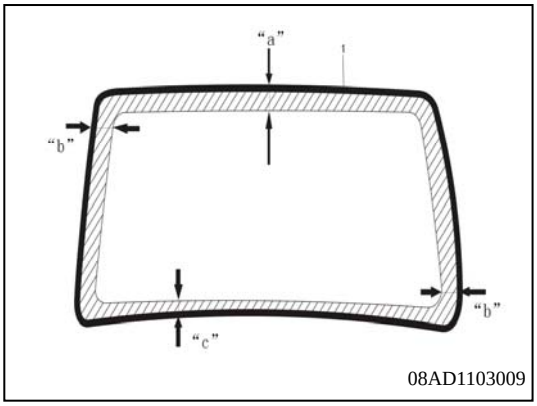
6) Use a new brush to brush sufficient primer along the adhesive edge of glass.



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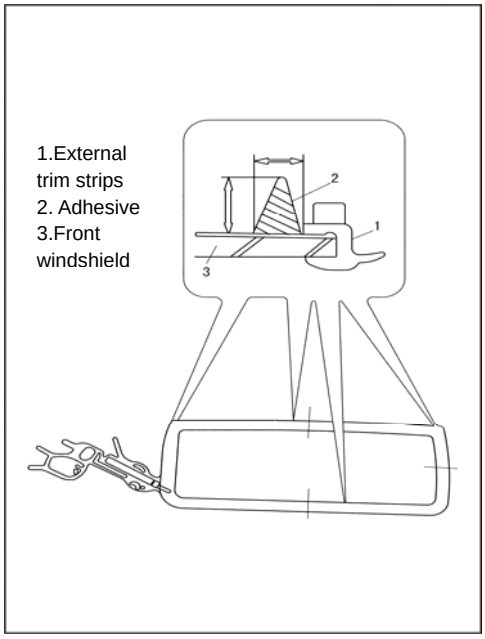
Attention:

- **Must comply to correct steps on instructions provided by primer manufacturer. And have them dried in required time.**
  Do not brush primary coat onto the surface of finishing coat.
  Do not touch primer-coated surface.
  Width “a” is about 20mm(0.78in)
  “b” is about 15mm(0.59in)
  “c” is about 18mm(0.70in)

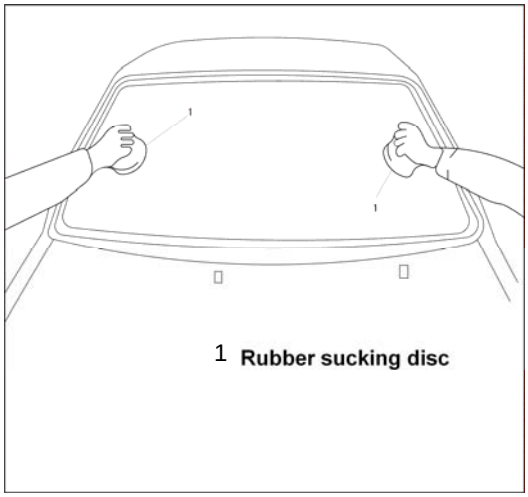
7) Coat adhesive referring to the figure on the right.

Attention:
- **Brush the glass from the side of bottom**
- **Be careful not to damage primer.**
- **The underside of adhesive shall be higher then that of the other three sides.**
- **Top, right and left side**
- **Width "e": about 8mm (0.31in)**
- **Height "f": about 14mm (0.55in)**
- **After adhesive-brushing, press glass into body at once.**
- **After adhesive-brushing, take the glass with a rubber sucking disc.**
- **Complete steps 7) ~9) within 10 minutes to ensure the adhesive has sufficient viscous.**
- **Processing methods and time for airing must comply with Instruction Manual provided by adhesive manufacturer.**



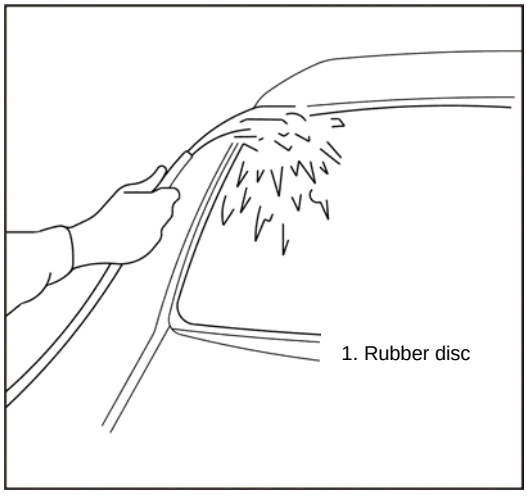
8) Press the glass into vehicle body with rubber sucking disc and pat the glass surface and strips around to firm it.

Attention:
- **Be careful not to damage glass surface or vehicle body.**



9) Check the leakage by spraying water from the outside of the window. If it leaks, dry the glass in the air and cover the leakage with adhesive. If it still leaks, take off the glass and reinstall it once according to the above-mentioned methods.

Attention:
- **Do not spray with high-press water.**
- **Do not blow the coated area for airing with compressed air directly when airing.**
- **Do not bake it with Far-Infrared Ray or similar methods.**



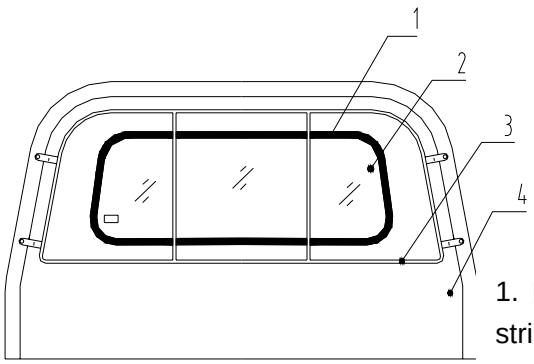
Attention:

Pay attention to the following while installing:

- **It may cause the glass unstable or fall off if you close the door suddenly before the adhesive solidified completely. So before solidified, ensure to open all glass on the doors with careful operation.**
- **In case of trim strips are not fixed in the specified place firmly, fix them with adhesive tape tightly until the adhesive completely adheres to them.**
- **Drying time for different adhesives is varied. Always refer to the Service Instructions provided by manufactory before adhering and find out the solidifying time of adhesive. Always comply to its notices when operating.**
- **In order to have it attached firmly, do not start the car before it dried completely.**

12）Install the rearview mirror, roof strips, front pillar strips and trimmings, sun shield, other trimmings and wiper.

8.3 Rear window



1. Rear window rubber strips
2. Rear window glass
3. Rear guard brackets
4. Rear panel welding assembly

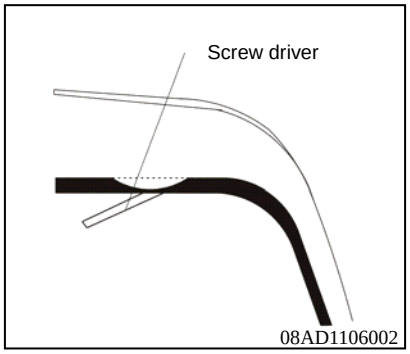
Comply with the following instructions to replace rear window:

Attention: Please wear safety glove to operate to process the following operation.

8.3.1 Disassembly

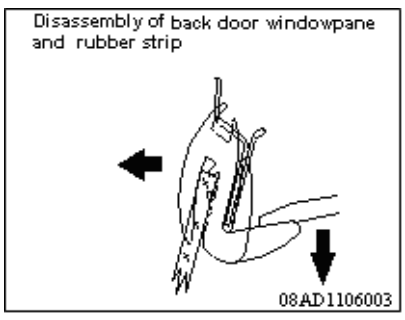
1. Replace rear window when it was cracked or broken:
   1）Remove the broken glass pieces；
   2）Remove the backboard guardrail with a spanner.
   3）Take off the strips from rear window frame.
   4）Clean up the broken glass pieces in strip channel.

Attention:
When cleaning up, protect vehicle body from scratched by broken glass pieces.



2. Replace rear window when it was scratched:

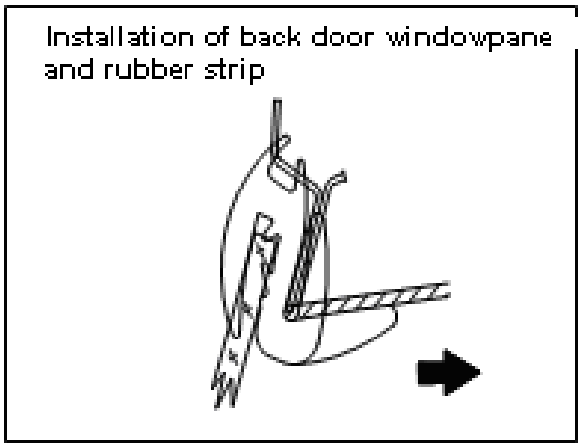
Tip up the bordure in the rear window rubber strips with a slotted screwdriver, meanwhile disjoin the glass hereof by pushing up slowly upwards. Make the bordure in the rubber strips turned out along the window frame slowly until all the edge of rubber strips turn out of the edge of window frame. Take off the glass rubber strip assembly and take apart adhesive from the glass.



Attention:
This operation should be operated carefully, be careful not to scratch vehicle body when using screwdriver.

8.3.2 Assembly

1） Invaginate the rear window into rubber strip appropriately.
2） Insert a flexible rope with 4-5mm diameter and 3.5m long into the whole bordure of glass rubber strip assembly and have the two ends of the rope crossed at the middle of rubber strip assembly’s longer side.
3） Put the glass rubber strip assembly with the rope onto the rear window frame and adjust it a little to make the glass rubber strip assembly aligned the window frame basically. The two ends of rope are inside the window frame.
4） Pull out the bordure in glass rubber strip by uprightly and adown pulling out the two ends of rope along the edge of window frame with a reserve direction to make sure the bordure in rubber strips is seized into the flanging of window frame.
5） Pull out the whole rope and hammer all rubber strip assembly around with a rubber hammer to ensure its rubber strips are jointed on the window frame well.
6） Spray the rear window with a water gun of vehicle cleaning for a couple of minutes and then go into the car from the front door to check if there is water permeable.
7） If it leaks, check the attached surface between glass strip assembly and window frame and repeat step 4) or replace with new windshield rubber strips.
8） Assembly will be defined as finish if no leakage.



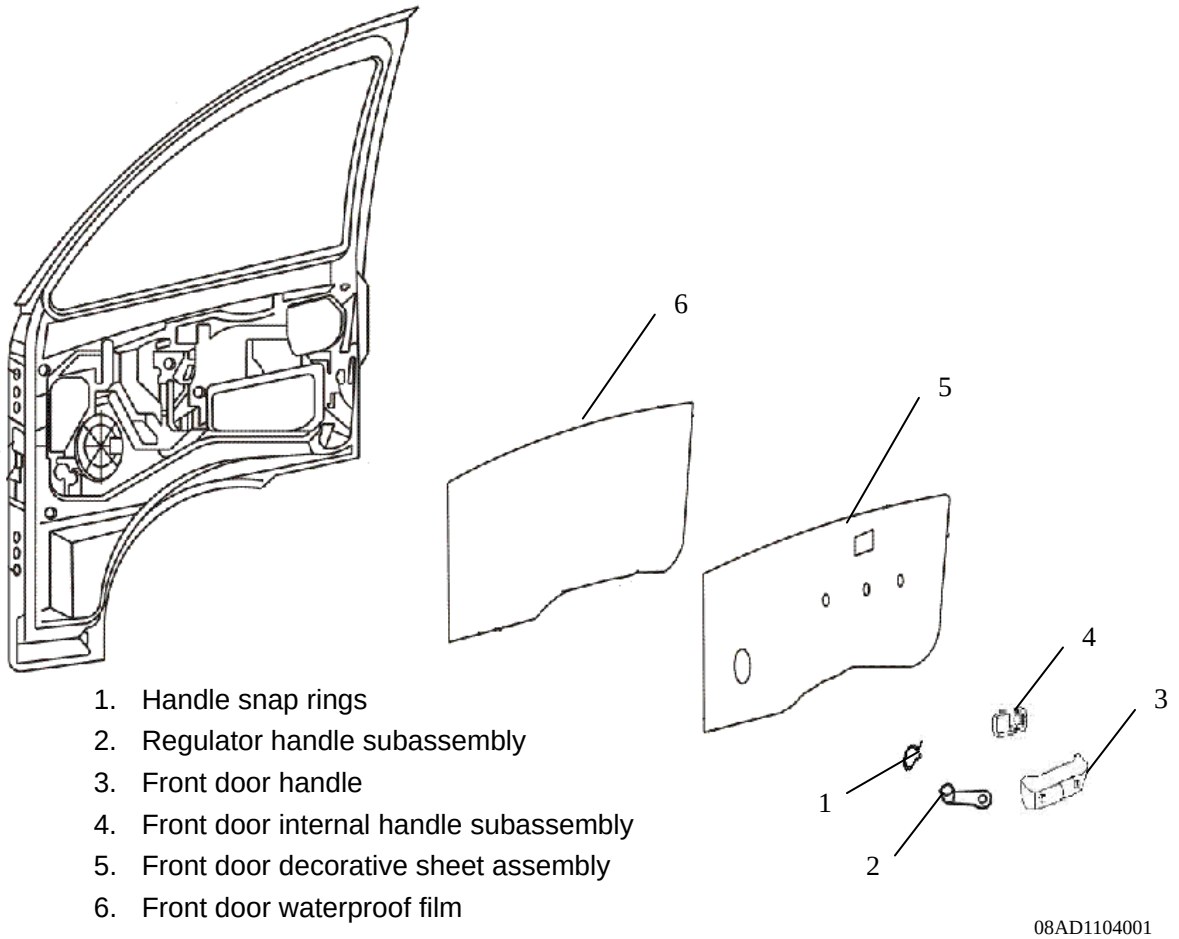
8.4 Front Door Trimmings

Get ready the following materials before installation:

	Name	Applications
Grease lubricant ,etc.	Butyl tape	seal or waterproof
	Grease Lubricant	Lubricative
Others	Suds	Make lubricate rubber strips slide more smoothly
	Brushes etc.	Used for brushing suds
	Wooden hammer	For Installing
	Adjusting hook	Used for door and window regulator and adjust split ring inside the rear door （made up of steel wire, etc.）
	Coatings(relevant)	Used for coat after disassembling(installing) and adjusting

Disassembly

Disassemble as sequence number as shown in the following figure:



1. Handle snap rings
2. Regulator handle subassembly
3. Front door handle
4. Front door internal handle subassembly
5. Front door decorative sheet assembly
6. Front door waterproof film

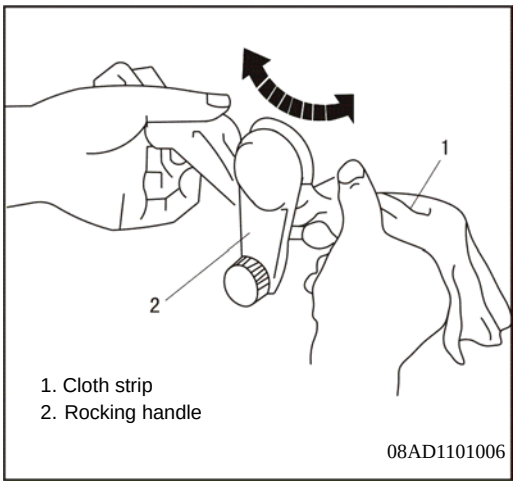
Tips:

Disassembling sequence：

Use a piece of cloth to disassemble shaft cotter pin at first and then disassemble regulator handle and front door decorative sheet.

Take off front door decorative sheet waterproof film with a slotted screwdriver.

Take off front door waterproof film.



1. Cloth strip
2. Rocking handle

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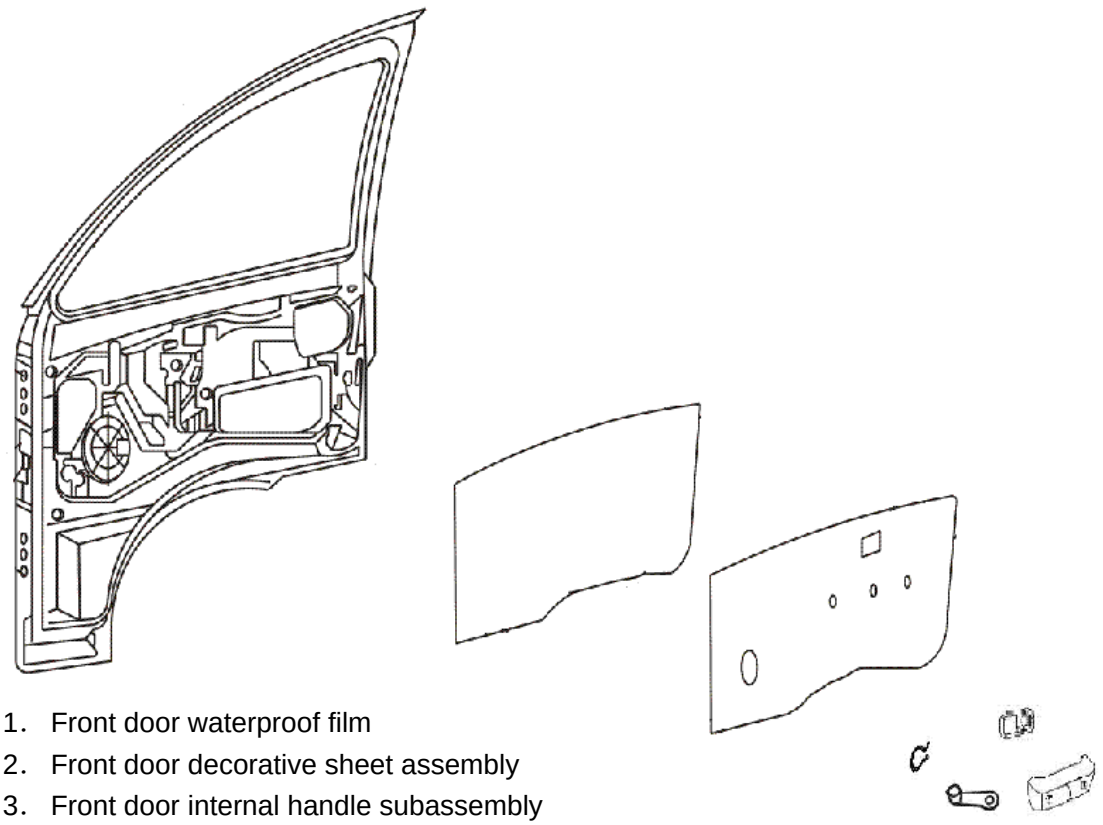
Attention

Take off waterproof film and butyl tape together at the same time in order to protect waterproof film from tearing.

Assembly

Assemble as sequence numbers as shown in the following figure:



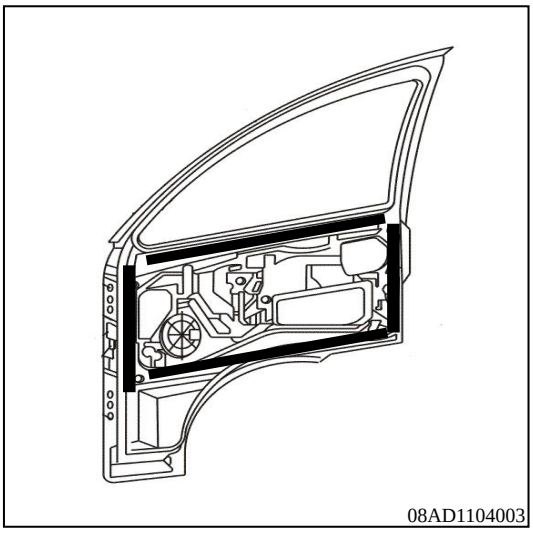
1. Front door waterproof film
2. Front door decorative sheet assembly
3. Front door internal handle subassembly
4. Front door handle
5. Regulator handle subassembly
6. Handle snap rings

Assembling steps:

Front door waterproof film

Refer to the figure at the right

1. Fix butyl tape along the panel groove, but not too tight.
2. Press waterproof film onto butyl tape and fix it.
3. Water leakage may occur if the film has defects such as torn, wrinkled, etc.



Window regulator handle

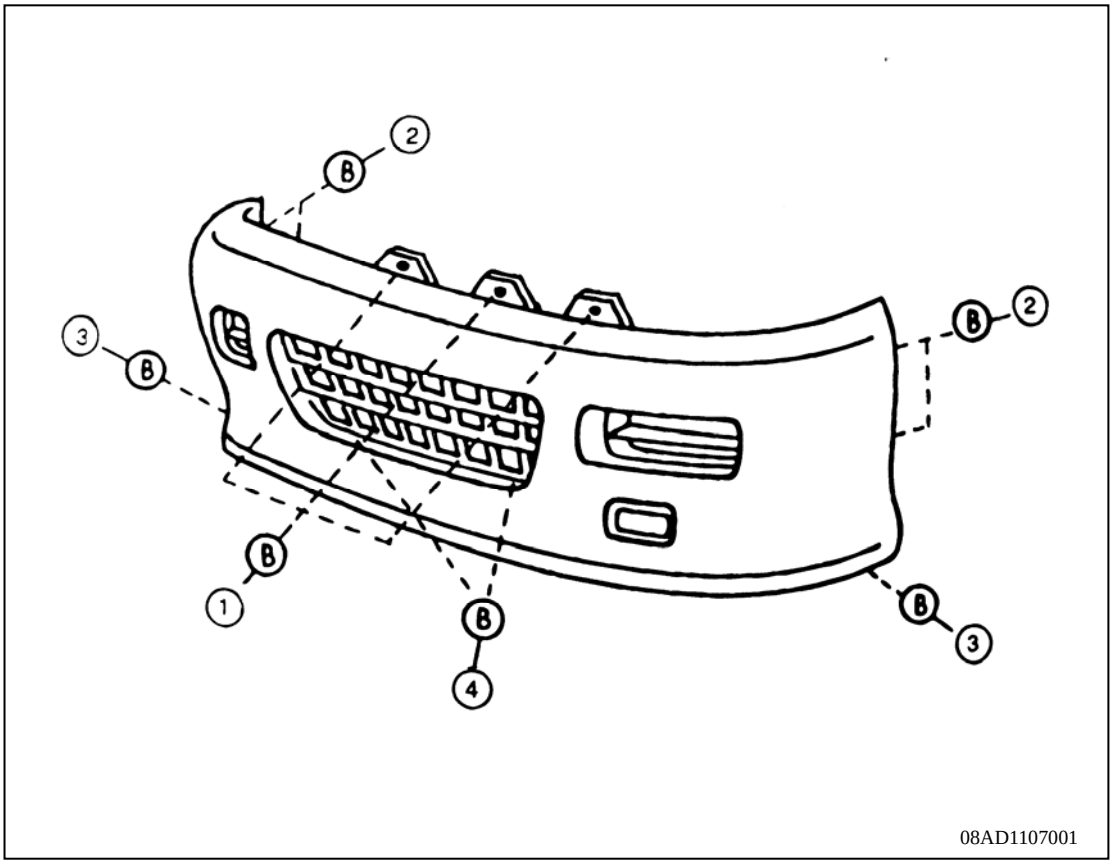
1. Install regulator handle together with handle snap ring onto front door.

Attention:
Install regulator handle subassembly after closing all front doors and windows.

8.5 Front Bumper

8.5.1 Disassembly

Disassemble as sequence numbers as shown in the following figure:



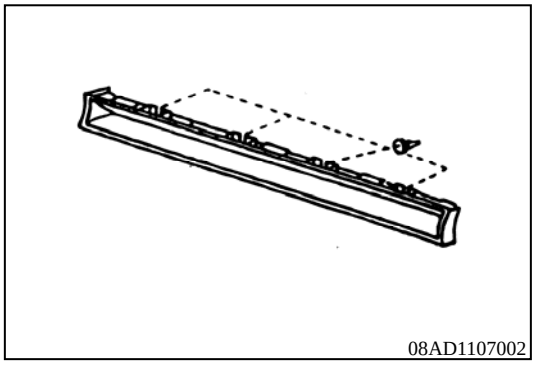
8.5.2 Tips

Tips for disassembling front bumper:

Front decorative panel

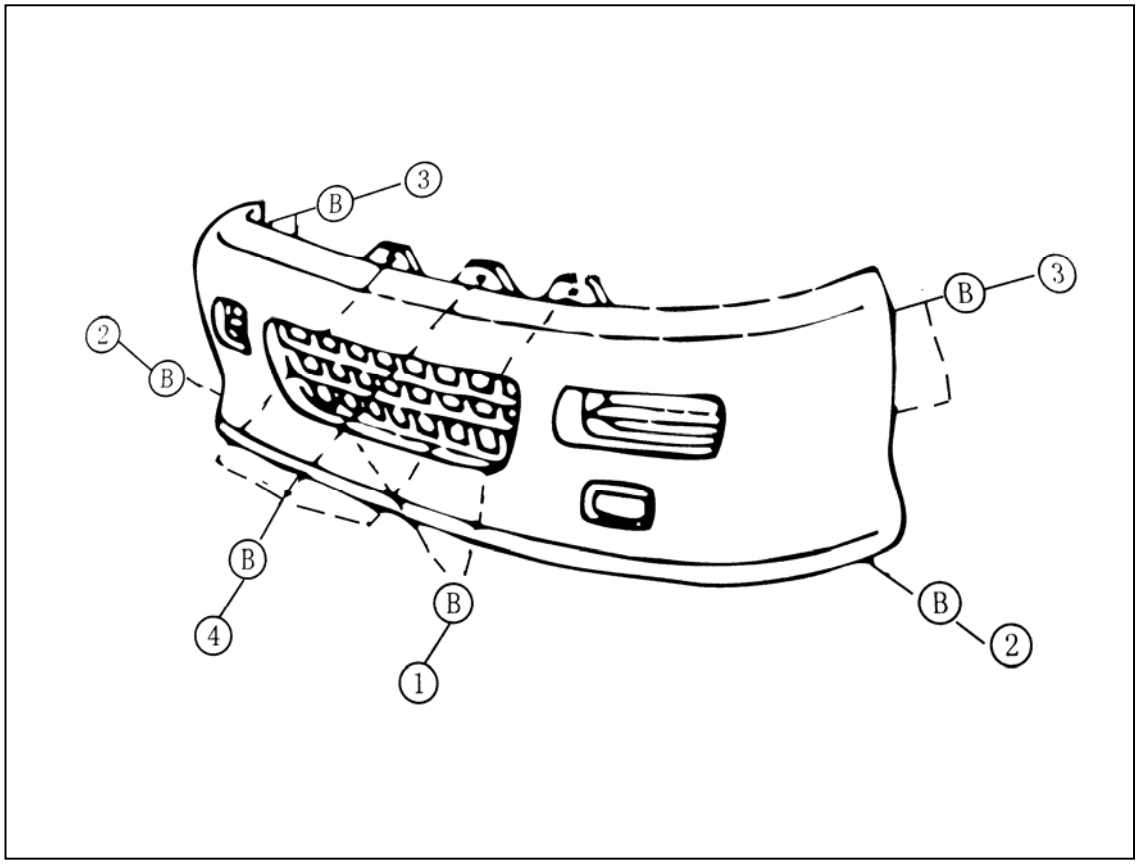
Screw off the four claspers inside the cab to disassemble and then may remove the front decorative sheet.

Front decorative panel.



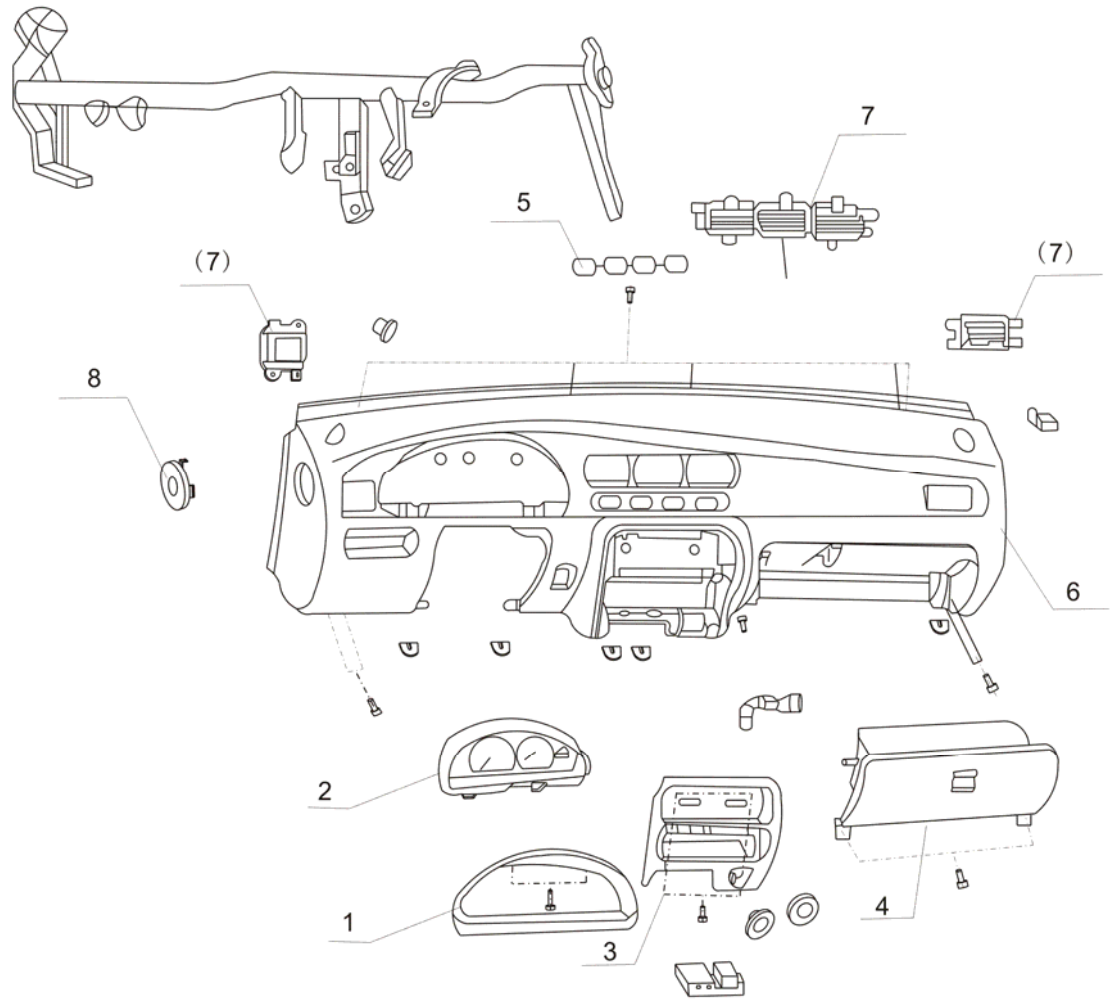
8.5.3 Assembly

Assemble as sequence numbers as shown in the figure：



8.6 Instrument Panel

Components of Instrument Panel



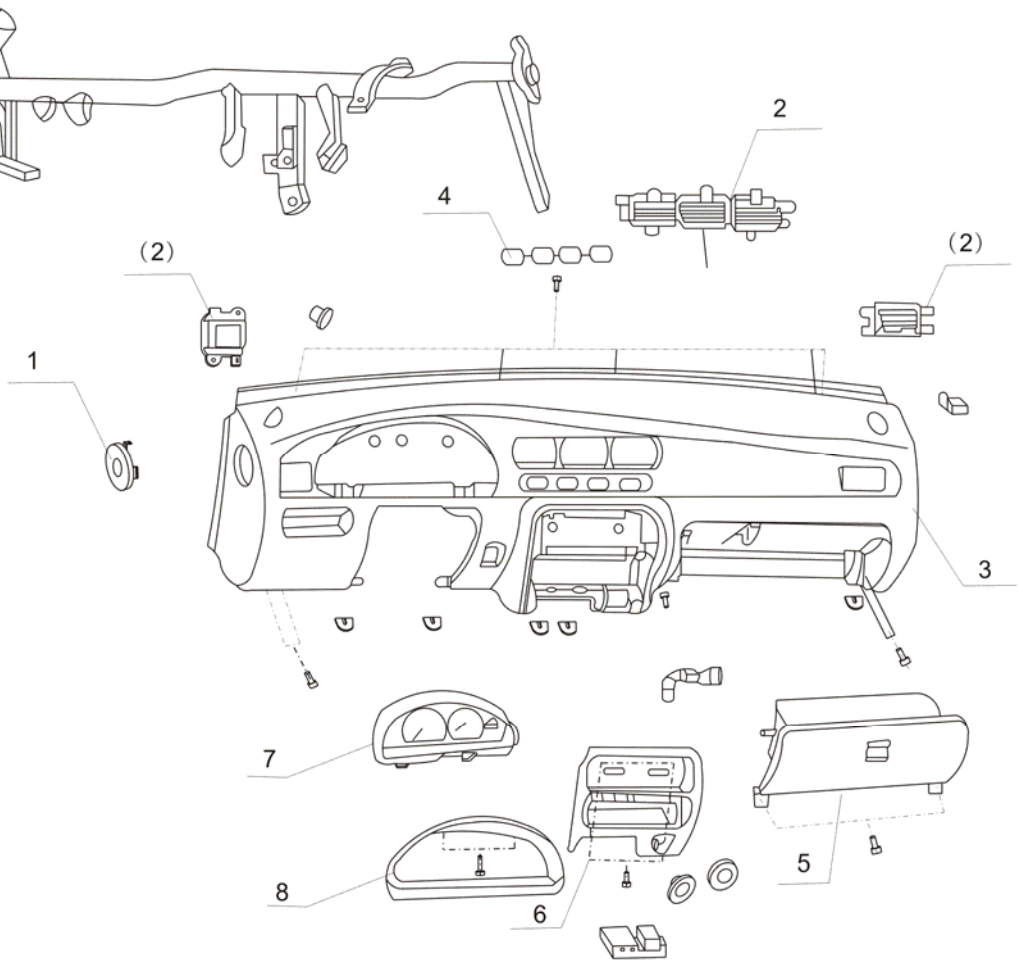
1. Meters Shield subassembly
2. Combined meters
3. Medium decorative sheet subassembly
4. Glove box
5. IP holes cover
6. Instrument panel
7. Tuyere subassembly of mid & side IP
8. Oil can cover

8.6.1 Disassembly

1. Disassemble “－” electrode of storage battery
2. Disassemble steering wheel
3. Disassemble as per sequence numbers shown above

8.6.2 Assembly

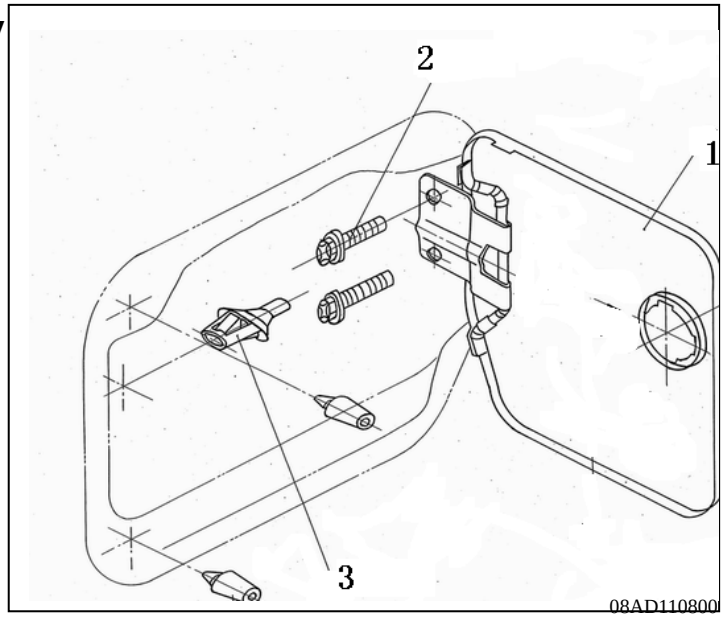
Assemble all components according sequence numbers shown as below:



1. Oil can cover 2. Tuyere subassembly of mid & side IP 3. Instrument Panel
4. IP holes cover 5. Glove box 6. Medium decorative sheet subassembly
7. Combined meters 8. Meters Shield subassembly

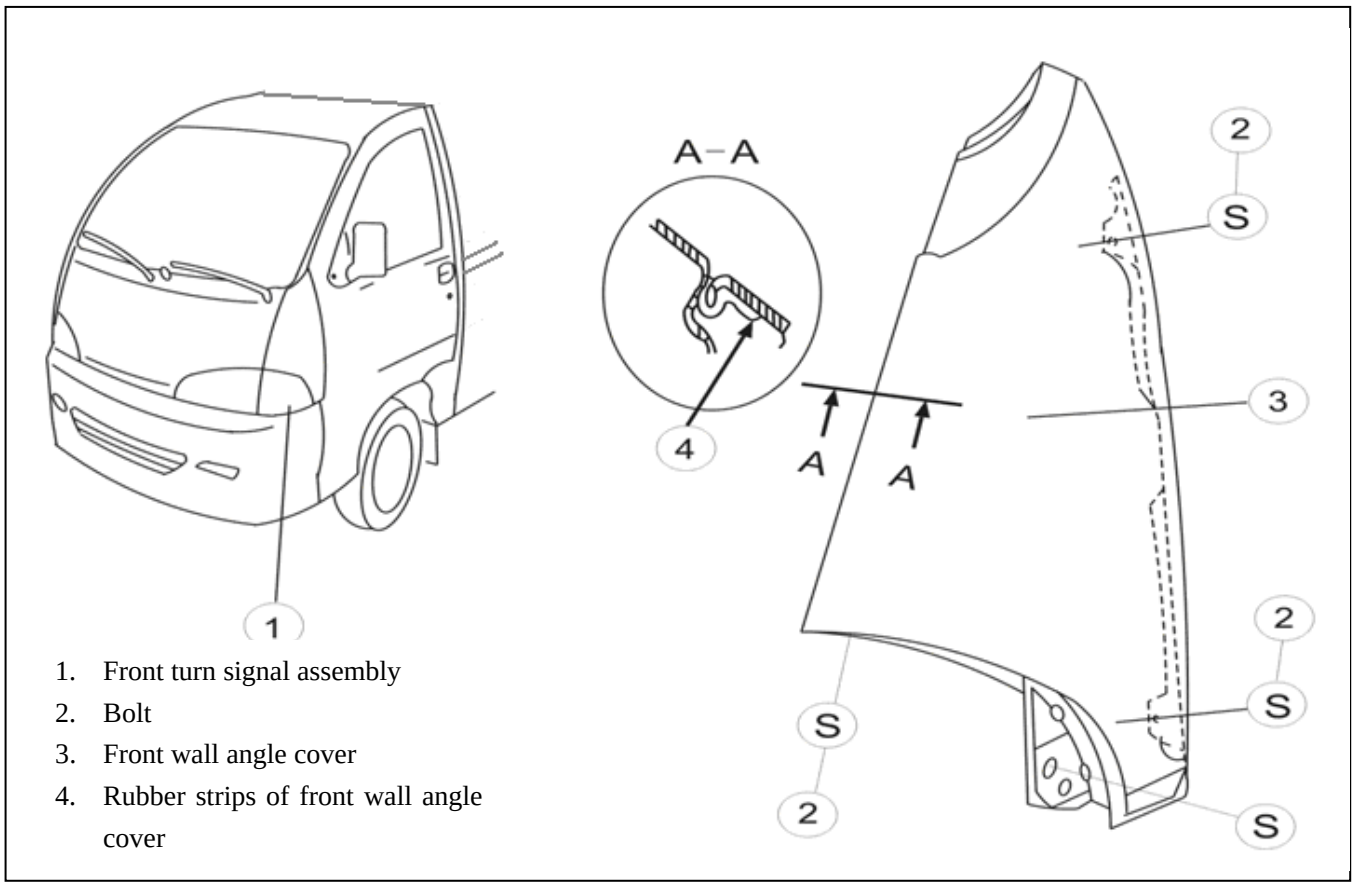
8.7 Fuel Filler Gate Subassembly

1. Fuel filler cap welded assembly
2. Bolts assembly
3. Fuel tank locker
4. Rubber buffer



8.8 Front Wall Angle Cover

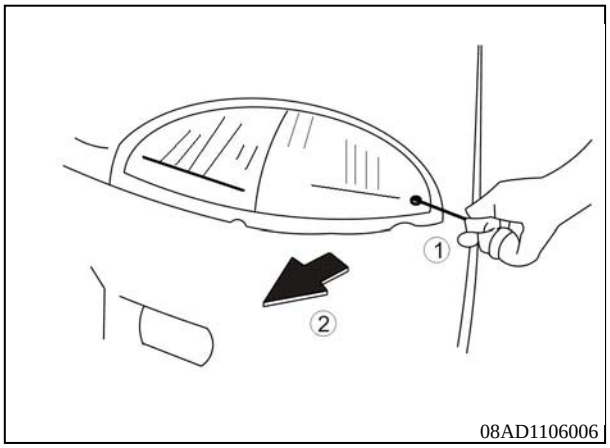
Disassemble as per sequence numbers as shown below:



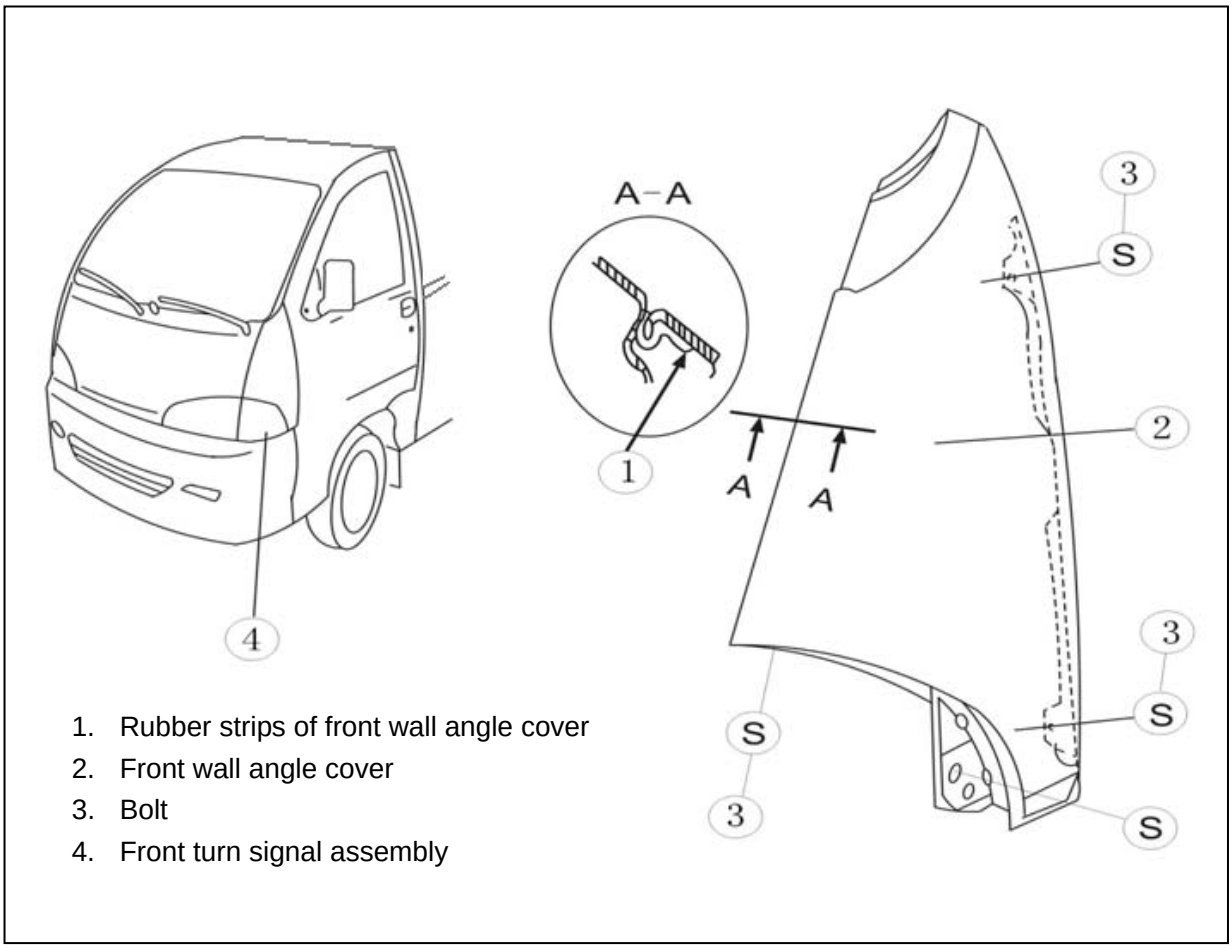
1. Front turn signal assembly
2. Bolt
3. Front wall angle cover
4. Rubber strips of front wall angle cover

Tips of Disasembly

Take off the front turn signal assembly at first, and then remove
Bolt 1 and turn signal assembly 2.



Assemble as per sequence numbers as shown below:



1. Rubber strips of front wall angle cover
2. Front wall angle cover
3. Bolt
4. Front turn signal assembly

Attention

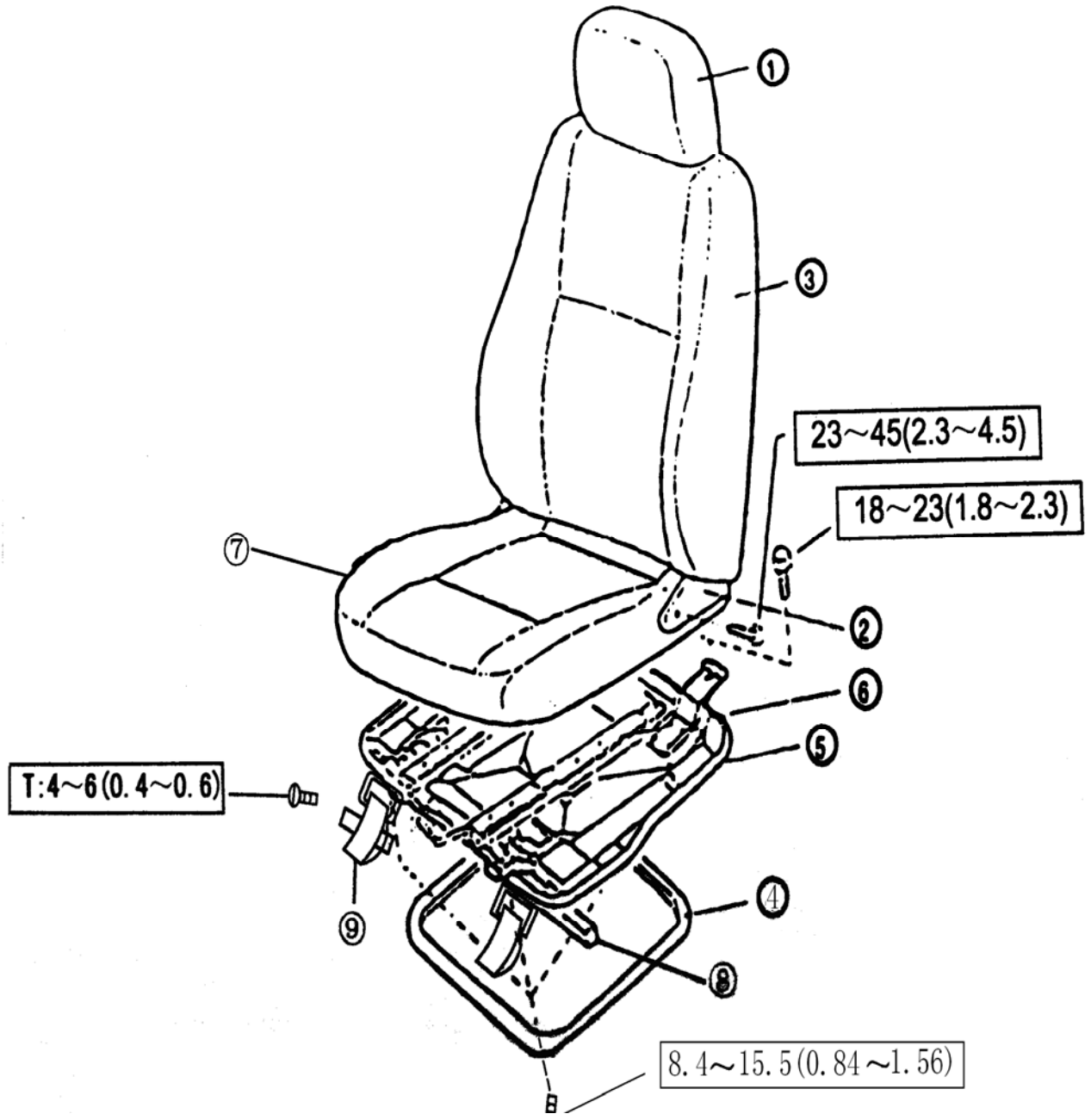
Be careful not to clamp windshield rubber trips while installing.

8.9 Seat

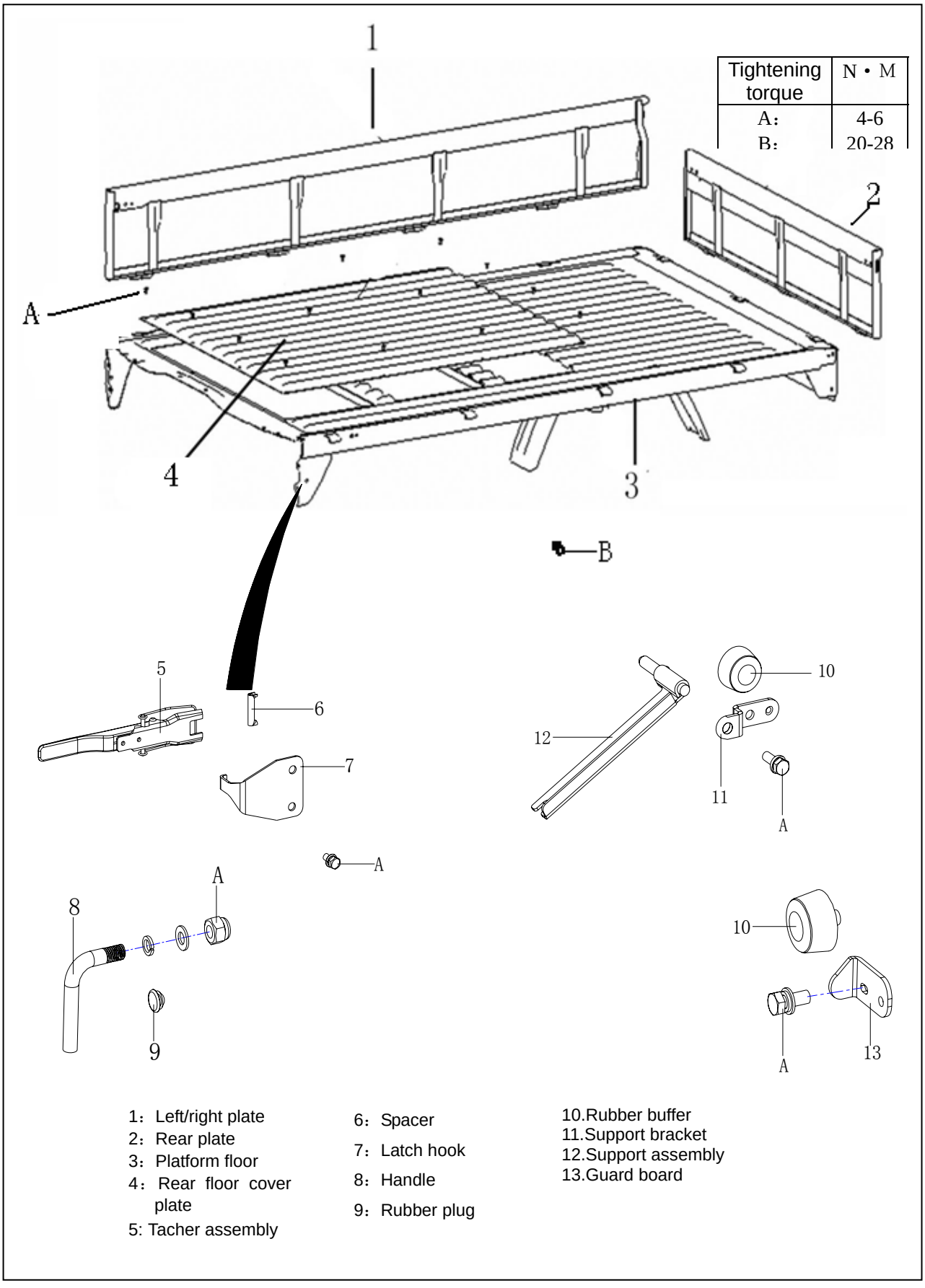
8.9.1 Front seat

T: Tightening torque

Unit: N·m (kgf-m)



8.10 Cargo Cabin



Tightening torque	N • M
A:	4-6
B:	20-28

1：Left/right plate
2：Rear plate
3：Platform floor
4：Rear floor cover plate
5: Tacher assembly
6：Spacer
7：Latch hook
8：Handle
9：Rubber plug
10.Rubber buffer
11.Support bracket
12.Support assembly
13.Guard board

Chapter 9 Protection Units

Contents

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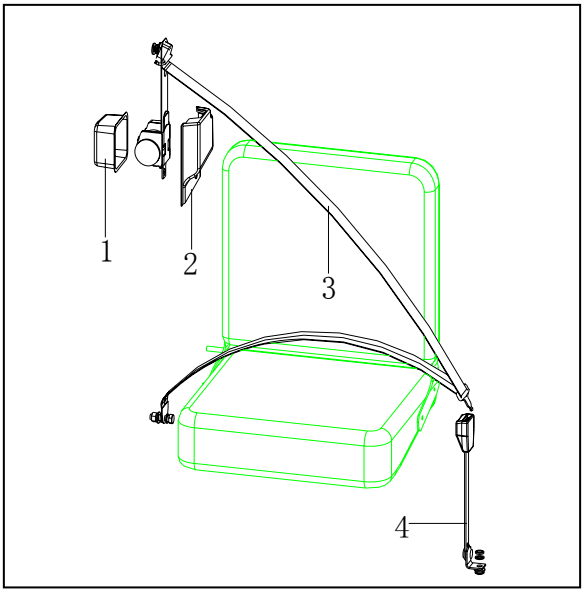
9.1.2 Maintenance Guide..... 9-2

9.1 Seat belt

9.1.1 Seat Belt Assembly



◆ **Front seat belt**

1. Dust box subassembly
2. Left/right seat belt outer cover
3. Left/right seat belt subassembly
4. Seat belt buckle

9.1.2 Maintenance Guide

Attention!

- **A full set of seat belt should be replaced if its belt retractor or lock/buckle subassembly is damaged even a little, by which ensure the safety performance of seat belts.**

Replace seat belt:

The seat belt must be replaced when crashed violently or damaged a component. Please play attention to the following:

1） Ensure that the seat belt retractors, tongues and buckles are in working order.

2） Keep the fabric belt in good condition; do not use a gapped or damaged one.

3） Keep away from sharp edge or things which may damage the seat belt.

4） Keep off chemicals or other medicaments which may contaminate fabric belts.

5） Use a torque spanner to screw down the set bolts of seat belt as per specified torque of 36~40N • m.

6） Do not have seat fabric belt twisted or tied.

7） Always keep fabric belts dry and clean.

Chapter 10 Complete Vehicle Electrical

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10.1 Automotive Power System

Automotive power system consists of power battery pack, auxiliary battery, DC/DC converter and charger.

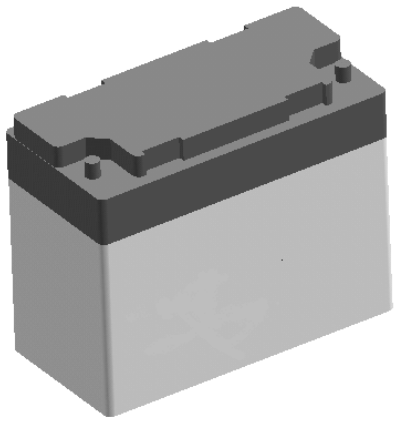
Power battery pack provides power for vehicle operation.

DC/DC converter provides power for in-vehicle 12V apparatus and auxiliary battery during vehicle operation; and DC/DC converter charges auxiliary battery during vehicle stop to charge.

When DC/DC converter stops output because of failure or the output of DC/DC converter can not meet the demand of in-vehicle 12V apparatus, auxiliary battery will provide power for in-vehicle 12V apparatus.

Charger charges power battery pack.

10.1.1 Power Battery Pack



◆ **Specifications**

Model: Valve-regulated sealed lead-acid battery

Capacity (C_5): 115A·h

Single battery voltage: 12V

Voltage for battery pack: 72V

◆ **Operational Safety and Precautions**

- Operators should be trained, or work under the guidance of professionals.
- During charging, prohibit any naked flame near battery for preventing self-igniting combustible gas in the air.
- The charging workshop of battery should keep good ventilation in favor of the diffusion of combustible gas.

Attention!

- **The tightening torque for battery interconnecting cables is 20±1Nm.**
- **At the beginning of use, the battery's open-circuit voltage difference is big, but with the use of battery, the voltage between monomers of battery pack will reach unanimity.**

- When operating battery, workers should wear safety goggles and dress protection suit.
- If electrolyte〈acid〉splashes into eyes or skin, immediately clean the affected parts with plenty of water and send for a doctor for inspection and therapy. The electrolyte on clothes should be soaked with clean water.
- Do not place tools on battery for preventing short circuit of battery.
- Use appropriate slings to hoist battery for preventing the drop of battery or the damage of battery shell.
- After discharge, charge as soon as possible.
- The maximum temperature of battery discharge should not exceed 55℃, and continuous operating temperature should not exceed 45℃, otherwise, the life of battery will reduce.
- The surface temperature of battery at the beginning of charging should be less than 40℃. If the temperature is more than 45℃, the battery should be charged after cooling.
- Discharge should not exceed 80% of standard capacity. The usual deep discharge will reduce the service life of battery.
- The battery should be fully charged for once every day, because the usual intermittent charge will damage battery.

Warning!

- **You should carefully reach relevant operation instructions before operating battery.**
- **Because the electrolyte has strong corrosion, you should operate and maintain battery according to the requirements of operation instructions for avoiding personal injury.**

◆ **Inspection and Maintenance**

- Daily Inspection and Maintenance:
  - The battery should be charged immediately after each discharge.
  - Each discharge should not exceed 80% of total capacity of battery.
- Weekly Inspection and Maintenance:
  - Inspect whether the cable screws among battery units are fixed.
- Monthly Inspection and Maintenance:
  - Inspect the voltage of all single batteries and make a record after 12 hours at the end of charging.
  - The difference between the measured value of single battery and the average value of whole battery pack should not be more than ±0.049V, if over the difference, the battery pack will be equalizing charged.
  - Keep the battery shell clean.

Warning!

- **Do not make up acid or water!**
- **Do not open or remove exhaust valve!**
- **Power battery pack contains high voltage which can harm people, and you should avoid electric shock accident during its inspection and maintenance.**

- Annual Inspection and Maintenance:
  - Professionals should inspect the insulation resistance of battery on vehicle for once annually. The specified value of insulation resistance of battery is 50Ω/V.
  - Inspect the charger for once according to relevant instructions for guaranteeing normal charge.

◆ **Storage**

- If the vehicle is not used for long, you should store it in the dry environment without frost.
- Fully charge the vehicle for once monthly.

◆ **Inspection and Repair**

- Excess temperature during the use of battery.

Possible Causes	Corrective & Preventive Measures
1. Overload work of electric motor car - Bad lubrication - Uneven damage/abrasion of tire - Brake drag 2. Excess ambient temperature	1. Reduce load. - Lubrication driving system. - Replace tire. - Inspect brake. 2. The ambient temperature for battery is required to be -20-45℃ which can not be exceeded.

- Big voltage discrete between battery

Possible Causes	Corrective & Preventive Measures
1. At the beginning of use of battery. 2. Depth of discharge usually exceeds 80%. 3. Never equalizing charge 4. Too dirty battery cover. 5. Internal short circuit	1. Measure after using the battery for a long time. 2. Avoid the depth of discharge more than 80%. 3. Equalizing charge for once monthly. 4. Clean and blow the battery dry after charging. 5. Find the battery with the lowest voltage and replace.

Warning!

- **If the battery is stored for a long time and not used, its service life will reduce.**

- Overtemperature of battery during charging

Possible Causes	Corrective & Preventive Measures
1. Failure of charger 2. Bad ventilation 3. Internal short circuit of battery 4. Vulcanization of battery plates	1. Inspect the charger's parameters (such as time, current, voltage, etc.). 2. Change the operation environment or use fan. 3. Inspect and replace short-circuit battery. . 4. Equalizing charge for long time, correct as much as possible.

- Too short working time of battery

Possible Causes	Corrective & Preventive Measures
1. Insufficient charge for battery. 2. Variable ambient environment - Mechanical failure - Failure of circuit - Too bad road 3. Internal short circuit of battery. 4. Battery service life end soon.	1. Inspect the charging time, prohibit over-discharge work of battery. 2. Confirm and change - Inspect brake and tire, lubricate. - Inspect motor and other power circuits. - Adjust the driving route or adjust load according to situations. 3. Inspect and correct 4. Make volume test.

10.1.2 Storage Battery

◆ **Specifications**

Type: 6QA36

Capacity (C_{20}): 36Ah

Voltage: 12V

Electrolyte Density (standard value): 1.28 g/cm^3 at 20°C

◆ **Inspection and Repair**

· Clean the surface and wiring terminal of battery, and

Warning!

· Because the battery will produce combustible hydrogen, avoid treating the battery near the place where there is kindling, otherwise, there is the possibility of explosion. The battery liquid can not touch the eyes and skins. In case of touching skin, wash the skin with clean water for more than 5 min, and cure in time.

apply lubricating grease to wiring terminal every half a month in winter and every 7～10 days in summer.

· Inspect electrolyte surface, keep the surface at 10～15mm above the surface, for insufficiency, add distilled water but not oil of vitriol. When the concentration of electrolyte is not enough, deliver the storage battery to professional service shop.

· Inspect the blowhole on the battery cover, and keep smooth.

· At 20°C, the standard value of electrolyte density is 1.28 g/cm^3, the reduction of density indicates the insufficient power of battery, and charge immediately.

· During the course of using vehicles, the battery is in the status of half charge and half discharge, and for a long time, the plate will be vulcanized. Take the battery away from vehicle every 3 months, and make the course of full charge and full discharge and recovery charge of re-charge.

Attention!

· User should adjust the specific gravity of electrolyte to 1.29～1.30 for preventing gelation at the cold area below -5℃.

10.1.3 DC/DC Converter

DC/DC converter converts 72V DC high voltage input by power battery pack to 12V DC low voltage for the use of on-vehicle 12V low voltage apparatus. If auxiliary battery loses power, DC/DC converter will charge it.

◆ **Specifications**

Input voltage: 50-90VDC

Output voltage: 12-14V

Max. output current: 20A

Attention!

·The failure of DC/DC converter will result in over low voltage of auxiliary battery, and even will damage auxiliary battery for a long time; therefore, the vehicle will not be used.

◆ **Use of DC/DC Converter**

- When the power battery pack charges, DC/DC converter can charge the auxiliary battery at the same time.
- When the key of vehicle is placed in “ACC” or “ON” gear, DC/DC converter provides power for complete-vehicle low-voltage apparatus.
- If the voltage display value of multi-functional display is less than 12.4V, it’s suggested to reduce low-voltage load, such as turning off lamps and radiogram, etc. for making the voltage return to 12.6V above as soon as possible, otherwise, the service life of auxiliary battery will be influenced.

Warning!

· There is high voltage between N1 and P1 input ends of DC/DC converter, so pay attention to the safety when measuring.

◆ **Maintenance of DC/DC Converter**

Regularly clear away the exterior of DC/DC converter and the dust and contaminant of radiation fin.

◆ **Inspection and Repair**

Please refer to electric schematic diagram for complete external wiring of DC/DC converter.

- When power battery pack fully charges, or during vehicle run, the voltage value of auxiliary battery is less than 12.5V.

Possible Causes	Corrective & Preventive Measures
1. 30A fuse cuts out 2. Relay I opens - Coil is burnt out - Contact ablates - The interior of G end connection wire of DC/DC converter disconnects 3. Relay II is burnt out. - Coil is burnt out - Contact ablates - 4. Auxiliary battery damages 5. Failure of charging circuit of auxiliary battery	1. Inspect whether corresponding circuit is short circuit or not, and replace 30A fuse after repair circuit. 2. Inspect and replace relay I. - Inspect the resistance value of coil with multimeter. - Inspect contact. - Inspect whether DC/DC converter G end connects N2 end with multimeter, if not, repair DC/DC converter. 3. Inspect and replace relay II. - Inspect the resistance of coil with multimeter. - Inspect contact. - 4. Before and after the operation of DC/DC converter, inspect the voltage of auxiliary battery with multimeter, if there is obvious change, the auxiliary battery damages. 5. Inspect whether the voltage of P1 and N1 input ends of DC/DC converter are close to 72VDC, and the voltage of P2 and N2 output ends are more than 12.5V or not, if not input, inspect the input wire and replace pre-charge relay; if input but not output, replace DC/DC converter; if input and output, inspect No. 8 rupture disc, output wire and replace output relay.

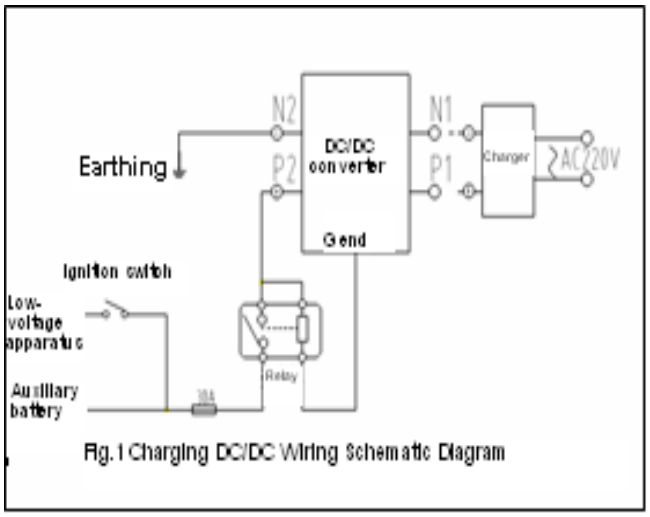
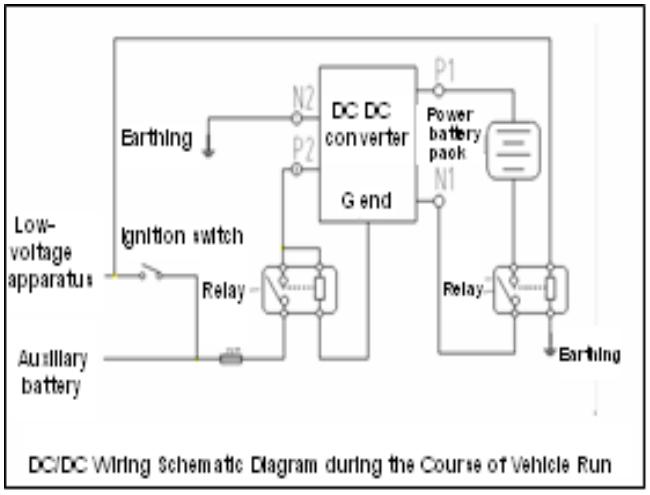


Fig.1 Charging DC/DC Wiring Schematic Diagram



DC/DC Wiring Schematic Diagram during the Course of Vehicle Run

10.1.4 Charging Generator

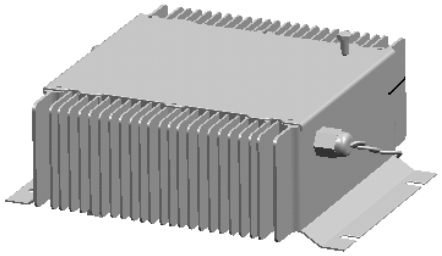
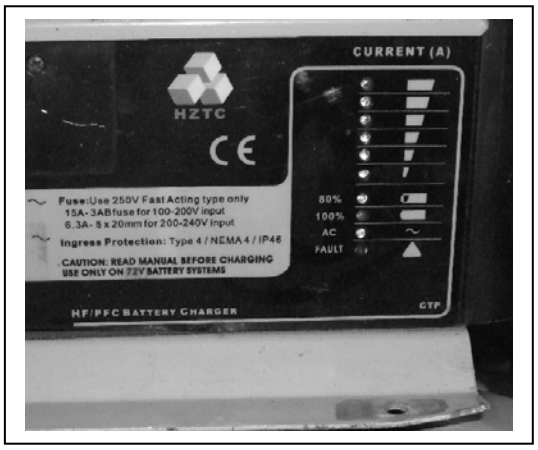


Fig. 2

The charging generator for this vehicle is in-vehicle charging generator.



◆ **Specifications**

Input voltage: 110VAC～60Hz

Adaptive battery pack voltage: 72VDC

Max. output voltage: 90VDC

Max. output current: 12A

Floating charging output current: Less than 2.5A

Max. charging time: 10h

◆ **Use of charging generator**

Connect the charging generator with AC power supply, charging generator AC indicator light is on, after detection time-delay, current indicator light is on, the charge begins.

After 100% capacity indicator light illumes, and after the charge ends, cut off the connection wire between charging generator and AC power supply.

◆ **Maintenance of Charging generator**

Periodically clear away the exterior of charging generator and the dust and contaminant of radiation fin.

◆ **Inspection and Repair**

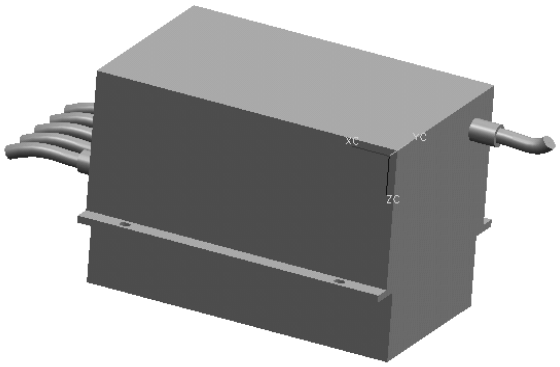
Failure indicator light of charging generator is on.

Possible Causes	Corrective & Preventive Measures
1. Overheating protection. When the temperature of the shell of charger exceeds 100℃, charger protectively turns off, and the charger automatically restores charging when the temperature reduces to about 80℃. 2. Short-circuit protection. 3. High and low-voltage protection. When the deviation of input power grid voltage from the rated nominal value exceeds 20%, the charger protectively turns off. 4. Overtime protection. When the charging time exceeds 18h, the charger protectively turns off. 5. Charger damages.	1. Corrective & preventive measures - Clear away the contaminant on the surface of charger. - Guarantee good ventilation at the charging field. 2. Inspect the charging circuit, electrify again. 3. Inspect the input power grid voltage, if the regular deviation of power grid voltage from rated nominal value exceeds 20%, increase the voltage stabilizing device. 4. Inspect the voltage and current value at the end (floating charge) of charging of charger. 5. Exclude the above protection, determine the charger is damaged, so please replace charger.

Warning!

- **Do not wash the charger with water.**

10.2 Controller



Controller controls the vehicle run according to exterior input (such as accelerator, brake, etc.).

Attention!

· When the controller stops operation (ineffective if stepping on accelerator) because of various protections (like overload, Undervoltage, etc.), turn off the ignition switch, re-start the vehicle after more than 10 seconds, and the failure will automatically disappear.

◆ **Maintenance of Controller**

- Periodically clear away the dust and grime of exterior controller.
- The inspection period of electric capacitor in the device is one year, if there is expansive deformation of shell or leakage, invite professionals to replace in time.

Attention!

· Before inspecting the failure of controller, please examine the failure code of multi-function display, and refer to Article 11.4 (the Reading of Failure Information) for the examination method.

Warning!

- **Controller circuit has high voltage which can harm people, cut off the battery connection wire when disassembling or assembling the controller.**
- **Need electrical and electronic professionals when repairing controller.**
- **There is high voltage in controller, maintenance, repair, wiring and changing wire should be made after cutting off the power for one minute, otherwise, an electric shock will happen, or the electronic elements will be damaged.**
- **Prohibit washing the controller with water.**

◆ **Inspection and Repair**

Multi-function display Showing Failure Code	Content of Failure	Corrective & Preventive Measures
E-01	Overvoltage of bus bar	When the voltage of DC bus bar exceeds the set value of system, the controller will blank off its output and alarm, and disconnect main contactor at the same time. After overvoltage protection appears, the ignition switch returns to “OFF” position, and the system will not run again until the system resets. When overvoltage protection repeats appearing, which should be regarded as failure, you should repair or replace controller.
E-02	IPM failure	When it is detected that IPM has over current, the controller will blank off its output and alarm, and disconnect main contactor at the same time. After IPM protection appears, the ignition switch returns to “OFF” position, and the system will not run again until the system resets. When IPM protection repeats appearing, which should be regarded as failure, the reason for failure is IPM damage or short circuit at load end. Replace IPM or inspect whether motor and the connecting cable connects earth or not.
E-03	Motor over current	When it is detected on control circuit that the output current of controller is more than the set value, controller will blank off its output and alarm, and disconnect main contactor at the same time. After over current protection appears, the ignition switch returns to “OFF” position, and the system will not run again until the system resets. When over current repeats appearing, which should be regarded as failure, inspect whether motor and the connecting cable connects earth or not.
E-04	Neutral position detection of Power on	When the vehicle is started, if the direction select switch is placed on “R” gear or “L” gear, the electric control system has no output, but outputs this failure code. Place the ignition switch on “OFF” gear, and place the direction select switch on “N” position, and then start this vehicle again, this failure will disappear.
E-05	Radiator >75℃	The controller detects the temperature of radiator, if the temperature is more than 75ºC, the controller will alarm but not blank off its output. You should reduce the load of this vehicle after the alarm signal appears.
E-06	Undervoltage of battery	When DC supply voltage is less than the set value of system, controller will blank off its output and alarm. If the battery under-voltage alarm usually appears, the battery pack will avoid this alarm after charging. If the reason for alarm excludes the battery factor, inspect the connection circuit between controller and power battery, if the circuit connection is normal, the alarm will be regarded as failure, repair or replace the controller.
E-07	Overspeed	The rotating speed of motor reaches or exceeds the limited rotating speed, blank off the output of controller.

E-08	Overload of thermal relay	When exceeding the overload capacity of motor, the controller output alarm, and the controller reduces the output power. After the alarm signal appears, reduce the load of vehicle.
E-09	Logic protection for driving	During vehicle run, if “R” position and “F” position of the direction select switch because of failure produce an effective signal at the same time, the electric control system stops output, and outputs this failure code. Place the ignition switch on “OFF" gear, inspect the direction select switch and service braking switch as well as its connection circuit, and then start this vehicle again, the failure disappears.
E-10	Effective alarm of service braking	When this vehicle is in the status of waiting to service, step on the service brake and then step on the accelerograph, the controller will blank off its output and alarm, loosen the accelerograph, lay down hand brake, the alarm disappears.
E-11	Contactor conglutinatio n	Inspect the contact of contactor, burnish the ablation or replace the contactor.
E-12	Contactor loss	Inspect the operating coil circuit and fuse of contactor; replace contactor; the voltage of auxiliary circuit less than 12V also results in the loss of contactor, the inspection and repair method refers to 10.1.3；Inspect whether the charging plug is inserted into the charging socket; replace the charging stop controller; inspect power circuit wiring.
E-13	Coded disc failure	Inspect circuit; replace coded disc sensor.
E-14	Pre-charging circuit failure	Inspect circuit; replace pre-charging resistance.
E-15	Current sensor failure	Inspect circuit; replace current sensor.
E-16	Voltage sensor failure	Inspect circuit; replace voltage sensor.
E-17	Phase stagger	Exchange two phasing lines.
E-18	Phase failure	——
E-19	Open phase	Inspect the connection of phasing line, and guarantee reliability.
E-20	Pedal position of accelerator	Step on the footplate of accelerator for starting, touch off this failure, release accelerograph to start this vehicle again, the failure will automatically disappear; the accelerator cable difficulty or sensor failure also touches off this failure, exclude mechanical failure or replace the sensor of accelerator.
E-21	Wrong starting order	Before starting motor system, prohibit the operation mode selection of forwarding or retrograding. Otherwise, the system will have no power output and display this failure at the same time; release the operation mode selection (place the direction selection switch on “N” position), start this vehicle again, the failure disappears.

10.3 Motor

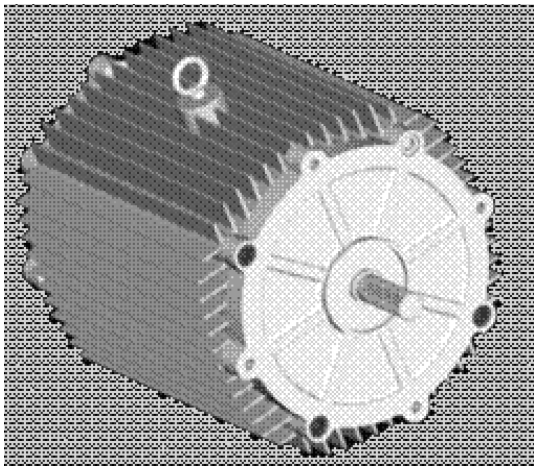


Fig. 3

◆ **Specifications**

Type: Three-phase asynchronous motor

Rated power: 6Kw

Rated current: 84A

Rated line voltage: 53V

Rated rotating speed: 2000rpm

Speed adjusting scope: 0-5800rpm

◆ **Motor Connection**

U, V and W lines of motor respectively connects with U, V and W lines of controller, and the motor coded disc line connects with controller.

◆ **Motor Use**

The battery on electric vehicle instead of engine is used as the power unit of vehicle, DC power supply output by battery passes controller and then is translated to three-phase AC power suply which will be supplied to motor and then translated to mechanical energy, drive the vehicle directly or through transmission case.

Warning!

- **Motor circuit possibly has the high voltage which can harm people, please firstly cut off the battery connection wire before disassembling and assembling motor.**
- **Prohibit immersing motor with water.**
- **Prohibit washing motor with water.**

The frequency of power supply output by controller can be continuously changed, so the rotating speed of motor also can be stepless adjustment, and the highest rotating speed can not exceed 5800rpm.

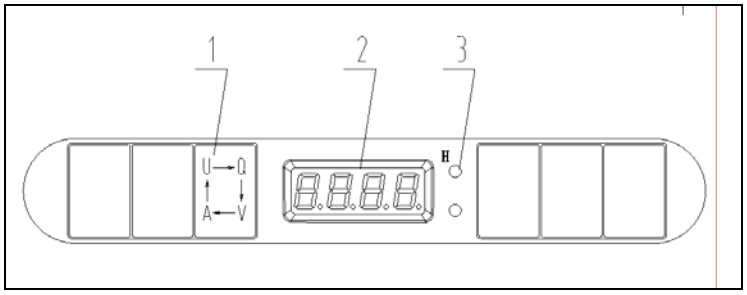
◆ **Motor Maintenance**

For guaranteeing heat dissipation effect of motor, regularly clear away the dust and pollutants of the exterior of controller.

◆ **Motor Inspection and Maintenance**

Failure Content	Analysis for Reason & Corrective & Preventive Measures
1. Insulation resistance of motor less than2 MΩ. - Motor damp. - Internal insulation material ageing of motor 2. Motor twitters near zero speed and can not rotate normally, examine current meter, current value is supranormal, examine controller, without failure information. 3. Difficult rotation after starting motor.	1. Remove motor from vehicle and examine - Dry motor and inspect insulation resistance. - If the change of insulation resistance of motor is not big after drying, it's possible that the internal insulation material of motor is aged, replace motor. 2. Wrong motor connection - Inspect whether the order of U, V and W phases of motor is correct or not. - Inspect whether the coded disc connection is good or not. 3. Problem on vehicle driving system - Release hand brake if not releasing hand brake. - If motor bearing seizure, replace motor bearing. - If the bearing seizure of retarder, replace the bearing of retarder. - If the coded disc signal is disturbed, change the wiring direction of coded disc wire. - If overload drive, reduce load. - If the accelerator damages, replace accelerator.

10.4 Multi-function Display



Warning!

- **When the vehicle has some failure, LED display of multi-function display will alternately display current display value and failure code.**

◆ **Panel Description**

1. Display screen:

The display screen shows the power battery's capacity, current, discharge power and 12V start battery voltage.

①. Capacity: Show residual capacity of power battery with two digits, such as 01, 02, 03……10, in which, 01 means 10% residual capacity, 02 means 20% residual capacity, 03 means 30% residual capacity,……, and 10 means 100% residual capacity, i.e. full load;

②. Power: Show power battery as accumulation value, unit: Kwh, with 6 integral digits, show page after page, set digit and reset digit by serial interface;

③. Current: Show the discharge current value of power battery, unit: A, with 4 digits including 3 integrals and 1 decimal;

④. Voltage: Show 12V start battery voltage, unit: V, with 3 digits including 2 integrals and 1 decimal.

2. Selector Button:

Q, W, A and V respectively show the power battery's residual capacity, discharge power, current and start battery voltage. Install four white light LEDs below the selector button, i.e. red (Q), blue (W), green (A) and yellow (V); solely lighten LEDs from red, blue, yellow, green to red, touch off switch; red point is bright, which shows the capacity value; blue point is bright, which shows the power value; yellow point is bright, which shows the current value; and green point is bright, which shows the voltage value;

3. Charging Cue Light/Failure Cue

When LED-1 (red light) at H flickers or intermittent buzz, which means the charging remind; when LED-1 is often bright or buzzer rings long, which means the charging alarm.

◆ **Function Description**

- After electrifying, the default is electric power display;
- When the ignition switch is at “ON” gear, display switch through touching off button; electric capacity → discharge power → current of power battery → start battery voltage → electric capacity; the display mode will change according to fixed order along with the pressing of button.
- Display of failure code

  When there is failure on vehicle, multi-function display continuously gives the alarm of three sounds, and partial failure information will be displayed through the display screen, the display type is like E-XX. When more than two kinds of alarm appear at the same time, multi-function display emits long and intermittent alarm.
- Charging Cue Light

  When power battery needs charging, this charging cue light is intermittent or often bright for providing warning.

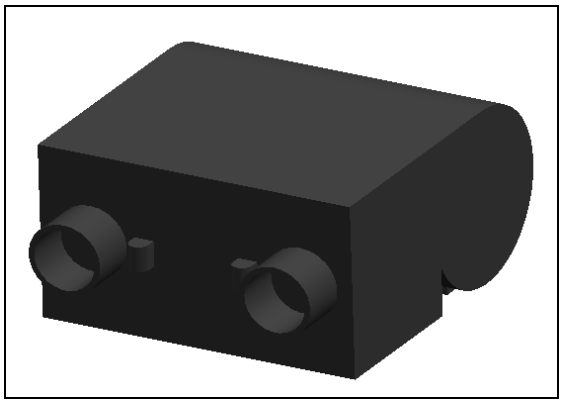
  When current electric capacity of power battery pack reaches 02, multi-function display emits short and intermittent alarm, at the same time, the charging indicator light is intermittently bright, which warns user to charge.

  When current electric capacity of power battery pack reaches 01, multi-function display emits continual alarm, at the same time, the charging indicator light is continuously bright, which warns user to charge as soon as possible, otherwise, the battery will be harmed.
- Multi-function display not only shows the electric capacity, current and other parameters, but also provides the drive signal to speed meter, odometer, voltmeter and current meter of combination instrument.

Inspection and Maintenance

If the display value is different from actual value, or the deviation of combination instrument is bigger, or the odometer has no display, you should inspect the connection and replace multi-function display.

10.5 Warming Machine



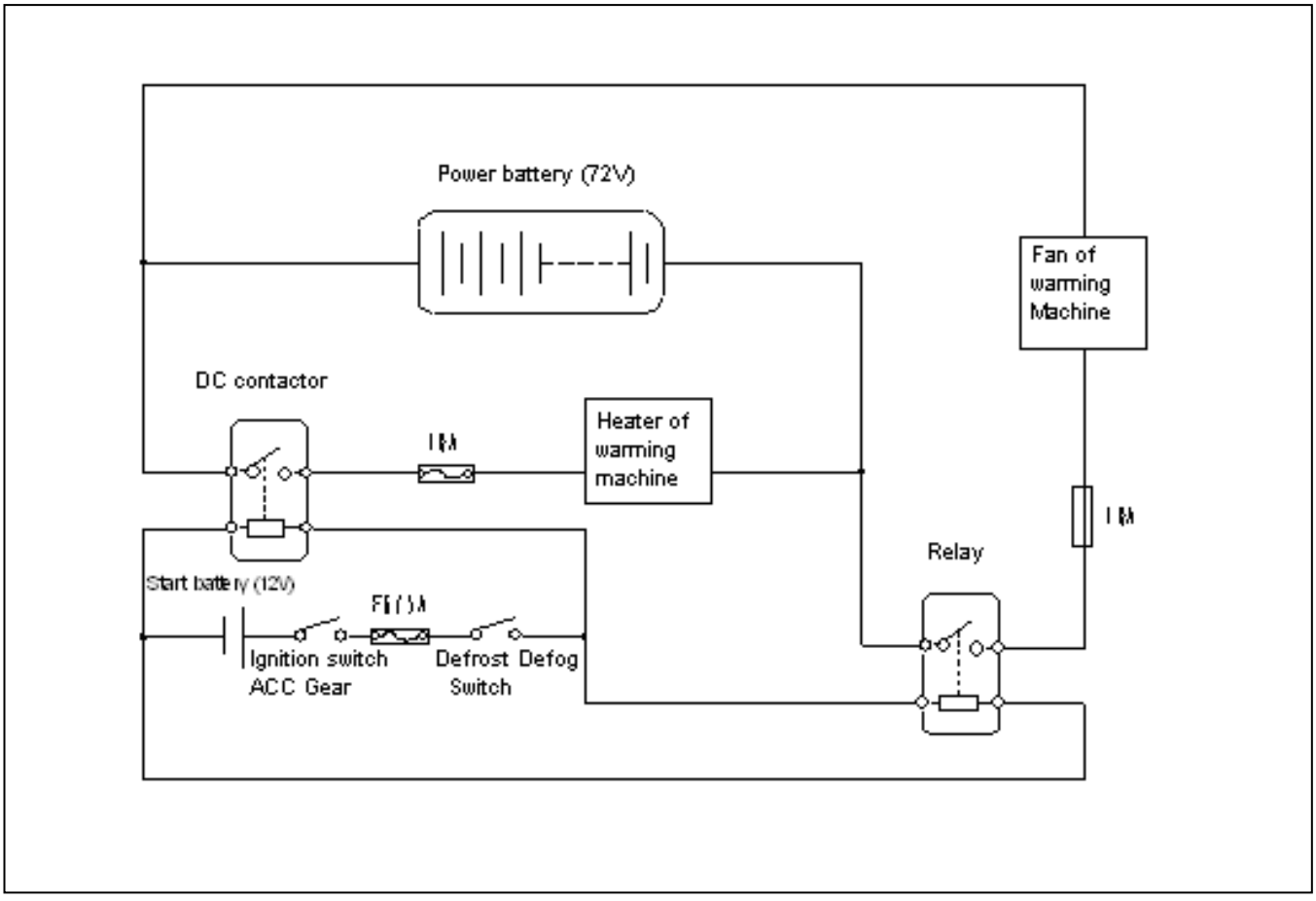
◆ **Specifications**

Rated power: 400～500W

◆ **Functional Description**

Control the operation of warming machine through “defog-defrost switch” on instrument panel to realize the function of defogging and defrosting.

◆ **Inspection and Repair**

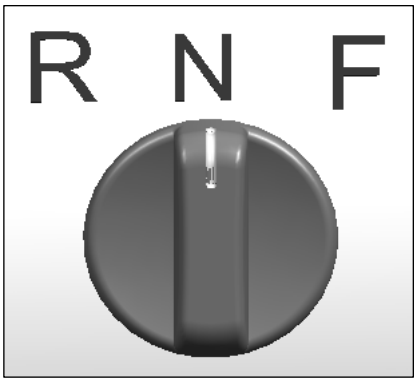


1. Measure the resistance of two units of outlet terminals of warming machine (one unit is fan, and the other unit is heater) with multimeter, and judge the damage of warming machine.
2. Inspect whether the fuse on circuit is damaged, if damage, please replace.
3. Inspect the contactor and relay, if damage, please replace.
4. Inspect whether the circuit has failure, such as broken line, short circuit, etc.

10.6 Direction Select Switch

Direction select switch is three-way rotary switch for the selection of vehicle driving direction.

In which, “F” represents the direction of advance, “R” represents the backing direction, and “N” represents neutral gear.



Warning!

- **Before the vehicle start, the direction select switch should be placed on “N” gear, otherwise, result in no start of vehicle.**

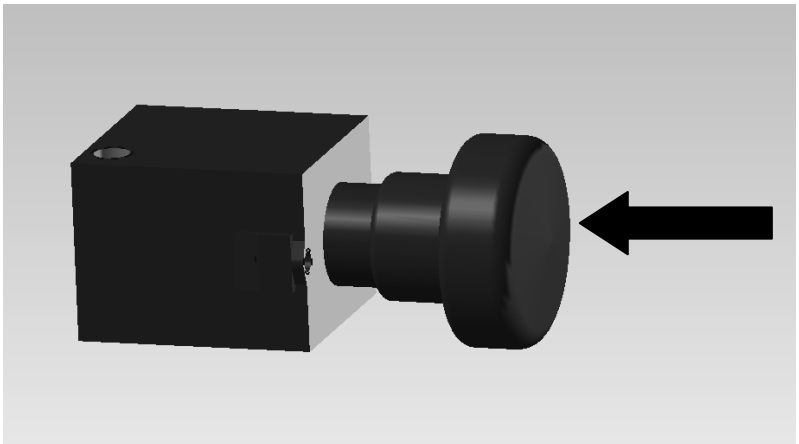
Warning!

- **During the course of vehicle run, do not change the gear of direction select switch, you should change after the vehicle stops stably.**

Inspection and Repair

Main contactor pulls in, multi-function display shows E-09 code, place the ignition switch to “OFF” gear, unplug plug-in connections of the direction select switch, start again, if the wrong code continues appearing, inspect & repair or replace the service brake switch; if wrong code disappears, replace the direction select switch.

10.7 Emergency Cut-off Switch



Emergency cut-off switch is the main power switch of power circuit, if emergency status happens, or there is need to cut off the main power, press the switch according to the direction of the above drawing (see the electric schematic diagram for details), cut off the power supply of power circuit.

10.8 Safety Device of Power for Vehicles

The safety device of power for vehicle includes large fork-bolt fuse and main contactor for electricity protection of high-voltage power circuit.

10.8.1 Large Fork-bolt Fuse

- **Specifications**

  Rated Current: 300A

- **Functional Description**

  For over current protection of high-voltage power circuit.

- **Inspection and Repair**

  After the vehicle is started, low-voltage circuit of vehicle is normal, but high-voltage power circuit has no reflection, please use multimeter to inspect whether large fork-bolt fuse is cut. Before changing large fork-bolt fuse, please inspect whether the power circuit connects the ground.

Warning!

- **Power circuit may have the high voltage which can harm people, you should cut off the connection of power battery when inspecting and changing large fork-bolt fuse for avoiding personal harm.**

10.8.2 Main Contactor

- **Specifications**

  Rated voltage of coil: 12VDC

  Rated current of main contact: 150A

- **Functional Description**

Warning!

- **Power circuit may have the high voltage which can harm people, you should cut off the connection of power battery when inspecting and changing main contactor for avoiding personal harm.**

After closing the vehicle system, the main contactor is used for cutting the connection between power battery pack and motor.

◆ **Inspection and Repair**

After the vehicle is started, low-voltage circuit of vehicle is normal, but high-voltage power circuit has no reflection, please use multimeter to inspect whether main contactor has failure.

Possible Causes	Corrective & Preventive Measures
1. The coil of main contactor is burnt out. - Bad quality of coil - Bad heat dissipation of main contactor 2. off-welding of coil connection wire of main contactor 3. Ablation of contact of main contactor	1. Replace main contactor. - Replace main contactor with good quality - Clean the joint part between main contactor and aluminum installation pedestal, recoat heat conduction silicate and install reliably. - 2. Re-weld the coil connection of main contactor. 3. Inspect the failure information of system, if no failure information, determine the fatigue damage of main contactor, and replace main contactor.

10.9 Lighting Device and Auxiliary Equipment of Meter Switch

◆ **Specifications**

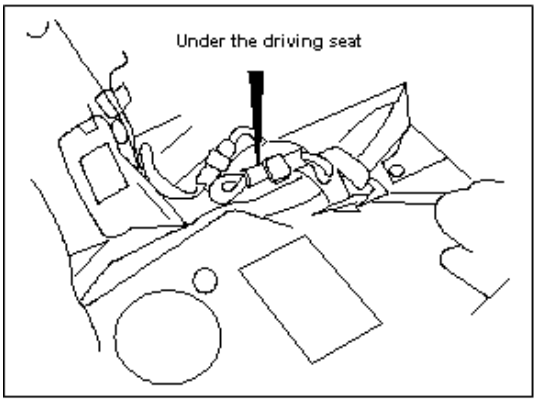
<table>
<tr>
<td>Total Fuse
Fuse section 1.25 mm^2
Allowed continuous working current: 33A</td>
<td rowspan="2">Residential lamp: 5W
Instrument mark lamp: 3.4W
Flash Apparatus
Flash time (in each minute)
Turn signal: 85±12
Dangerous signal: 85±12</td>
<td>Horn
Effective working voltage: 9～14.5V
Power consumption: Less than 3.5A
Voice voltage: 100～115 dB
Basic frequency: 350±20 HZ</td>
</tr>
<tr>
<td>Fuse
Capacity: 15A
Head lamp: 60W/55 W
Rear fog lamp: 21 W</td>
<td>Radio & Cassette Player
Receiving wave range
Frequency modulation (FM): 88～108MHZ
Amplitude modulation (AM): 535～160KHZ
Antenna
Type: Rod antenna</td>
</tr>
<tr>
<td>Front Lamps
Head lamp: 60/55W
Turn signal lamp:21 W
Front position lamp: 5 W
Side turn signal lamp: 5W</td>
<td>Windshield Wiper
Wiper motor (Permanent Magnet Type)
Rotation speed without load:
High gear 70±10 r/min
Low gear 45±5 r/min
Clearance gear: about 13
Length of wiping piece: 400mm</td>
<td>Loudhailer
Rated power: 4W
Dimensional specification (mm): 100×100
Installation position: Internal plate at left and right front door (or instrument panel)</td>
</tr>
<tr>
<td>Rear Lamps
Turn signal lamp: 21W
Service brake lamp/tail lamp:21 W/5 W
Backup light: 21w
License plate lamp: 5W</td>
<td>Syringe
Electric power consumption: Less than 3A
Hydraulic pressure: 88 kPa
Kettle capacity: 1.2 L</td>
<td></td>
</tr>
</table>

10.9.1

Fuse

Total fuse

· Inspect whether there is blowout with multimeter. If blowout, which shows that the circuit has problem. Before changing total fuse, make sure to find reasons and repair.



Warning!

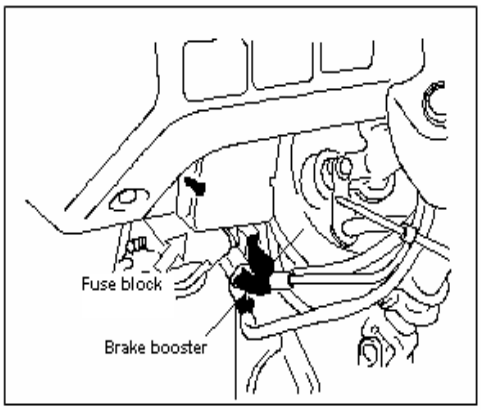
·If you change total fuse, make sure to use the total fuse with the same specifications for preventing the damage of vehicle or fire.

◆ **Fuse block**

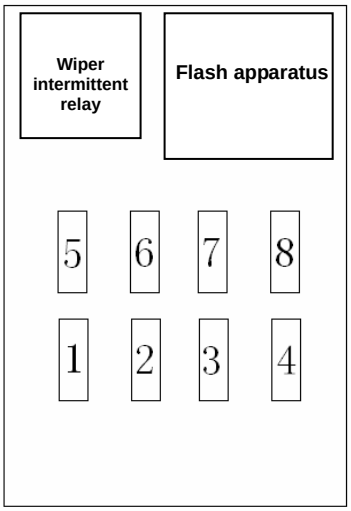
· Inspect whether the fuse socket is loosened, or the fuse in the fuse holder is firm.

· Inspect whether the capacity of fuse piece on each circuit is correct.

· Inspect whether the fuse piece is burnt out. If burnt out, firstly find out reason for repairing, and then replace. Make sure to use the fuse piece with stipulated capacity when changing fuse piece.



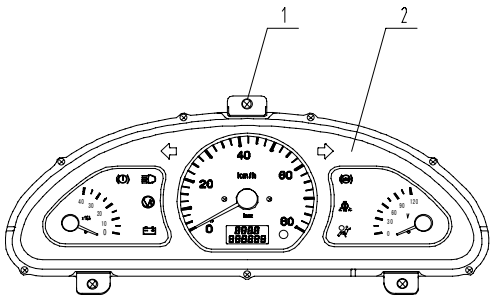
◆ **Fuse Box**



15A/12V per Piece for Fuse Specifications

1. Combination instrument
2. Blank
3. Blank
4. Cigar lighter, Radio & cassette player, Warming machine control, 12V battery charging relay
5. Blank
6. Rain blade, Turn signal
7. Lamplet , Residential light, Horn
8. Dangerous power supply

10.9.2 Combination Instrument

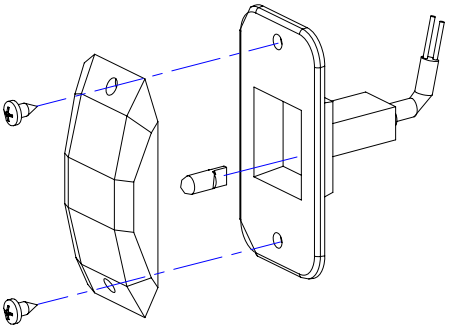


1. Tapping bolt ST4.8*19
2. Assembly of Combination Instrument

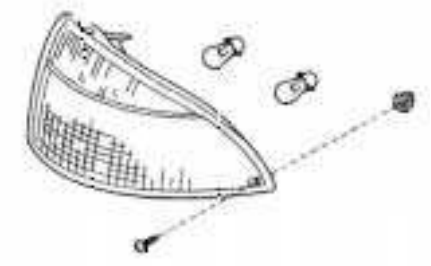
10.9.3 Lightening System

Lightening system includes head lamp, front blinker, rear combination lamp, side turn signal lamp, reversing lamp, license plate lamp and residential lamp.

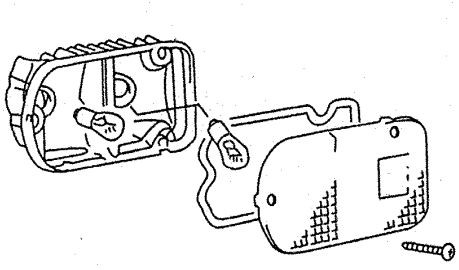
Headlamp



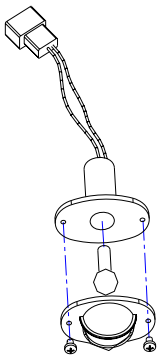
Side Lamp



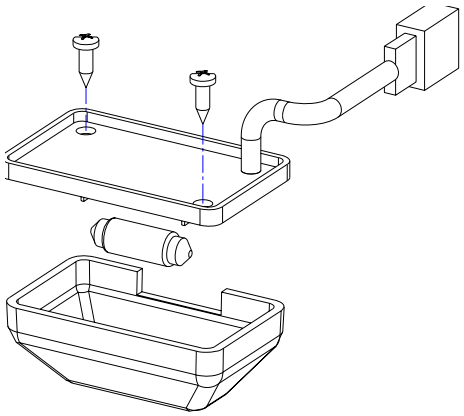
Front Signal Lamp



Rear Combination Lamp



License Plate Lamp



Ceiling Lamp

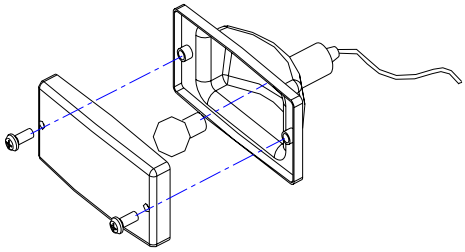
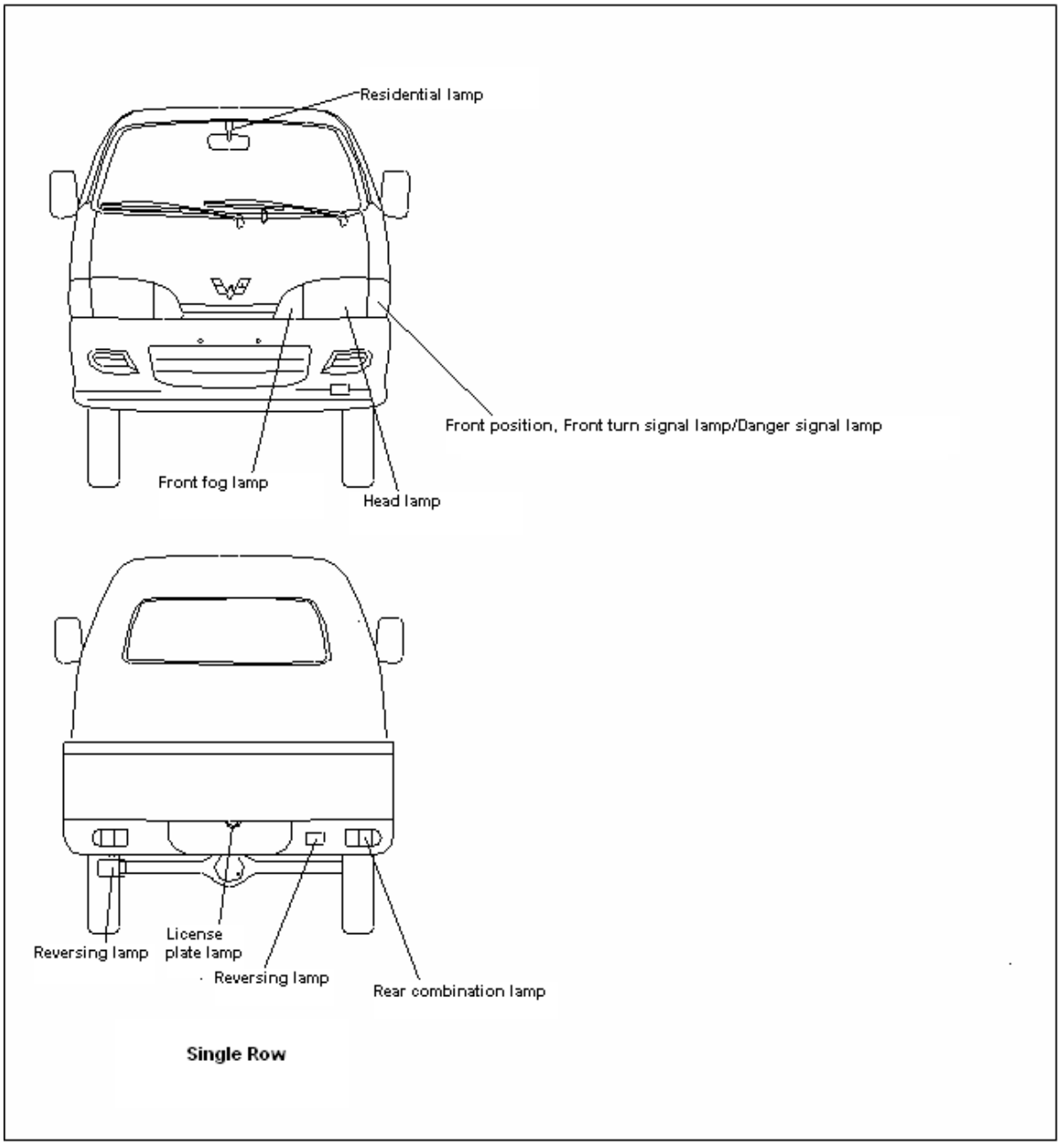


Fig. 4

Reversing Lamp

◆Arrangement and Specifications of Lamp



Bulb	W	Bulb	W
Front lamp	60/55	Front turn signal lamp/danger lamp	21
Front position lamp	5	Rear combination lamp	21/5
Reversing lamp	21	Residential lamp	5
License plate lamp	5X2	Front fog lamp	55
Rear fog lamp	21		

◆ **Guidance for Maintenance**

1. Inspect whether the bulb is damaged, if damage, please replace.

2. Inspect whether the combination switch is damaged, if damage, please replace.

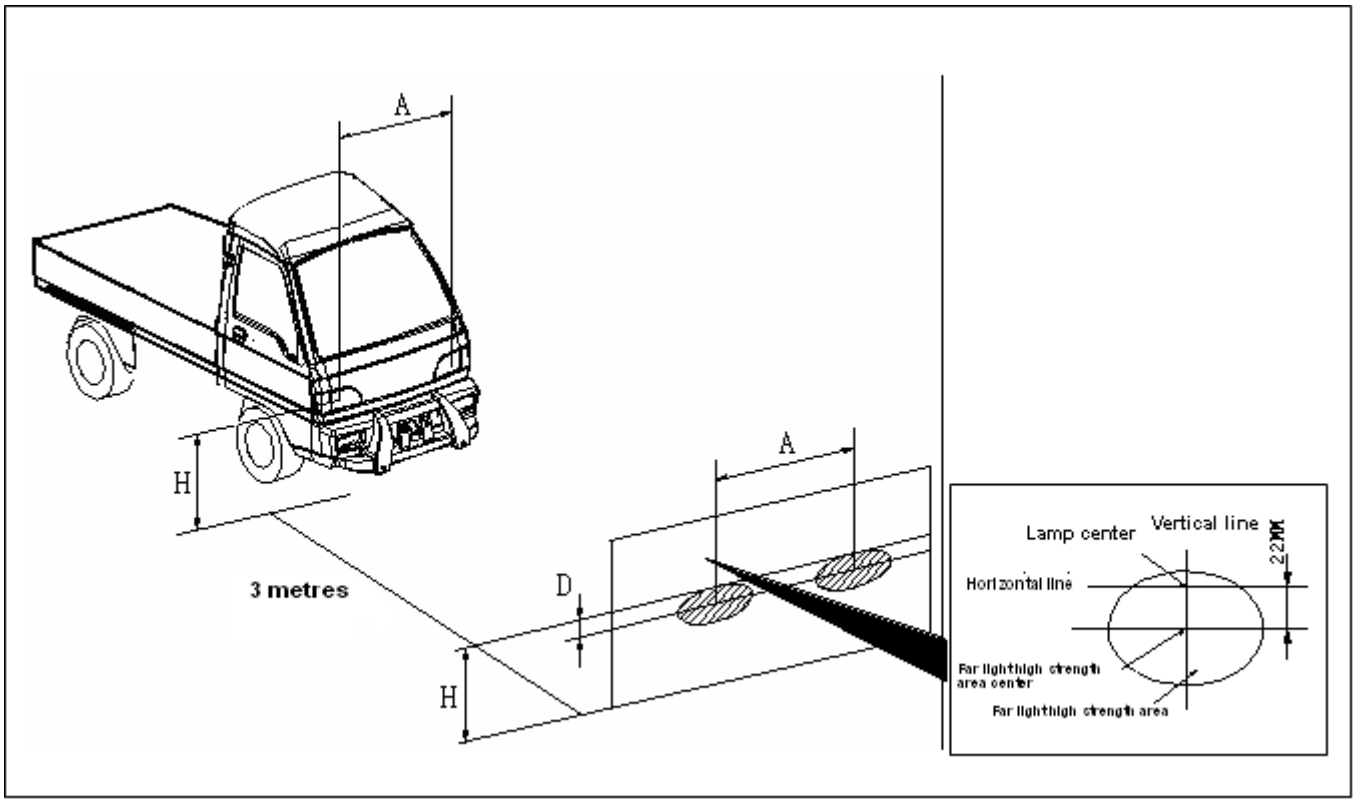
3. Inspect whether the power supply circuit has failure, such as short circuit, broken circuit and fuse damage. See electric schematic diagram for details.

Symptom	Possible Causes	Repair
One head light not bright	Bulb is burnt out Socket is damaged	Replace bulb Wire is damaged or earthing is bad. Repair according to requirements
Head light not bright	Easily fusible link or fuse is burnt out Lamp switch is damaged Wire is damaged or contact is bad	Replace easily fusible link or fuse Inspect switch Repair according to requirements
Far light or dim light not bright	Wire switch or dimmer switch is damaged Wire is damaged	Inspect switch Repair according to requirements
Head light, tail light or license plate light not bright	Tail fuse is burnt out Easily fusible link is burnt out Side lamp switch is damaged Wire is damaged or earthing is bad	Inspect short circuit, replace fuse Replace easily fusible link Inspect switch Repair according to requirements
Turn signal light not bright	Switch of turn signal lamp is bad Wire is damaged or earthing is bad	Inspect switch Repair according to requirements
Turn signal light at two sides not bright	Turn fuse is burnt out Turn signal danger switch is bad. Turn signal flash relay is damaged. Wire is damaged or earthing is bad.	Inspect circuit, replace fuse Inspect switch Inspect flash apparatus Repair according to requirements
Brake light not bright	Horn fuse is burnt out Parking lamp switch is damaged Wire is damaged or earthing is bad	Inspect short circuit, replace fuse Inspect switch Repair according to requirements
Brake light often light	Brake lamp switch is damaged	Adjust or replace switch

· **Adjustment of Headlight Beam**

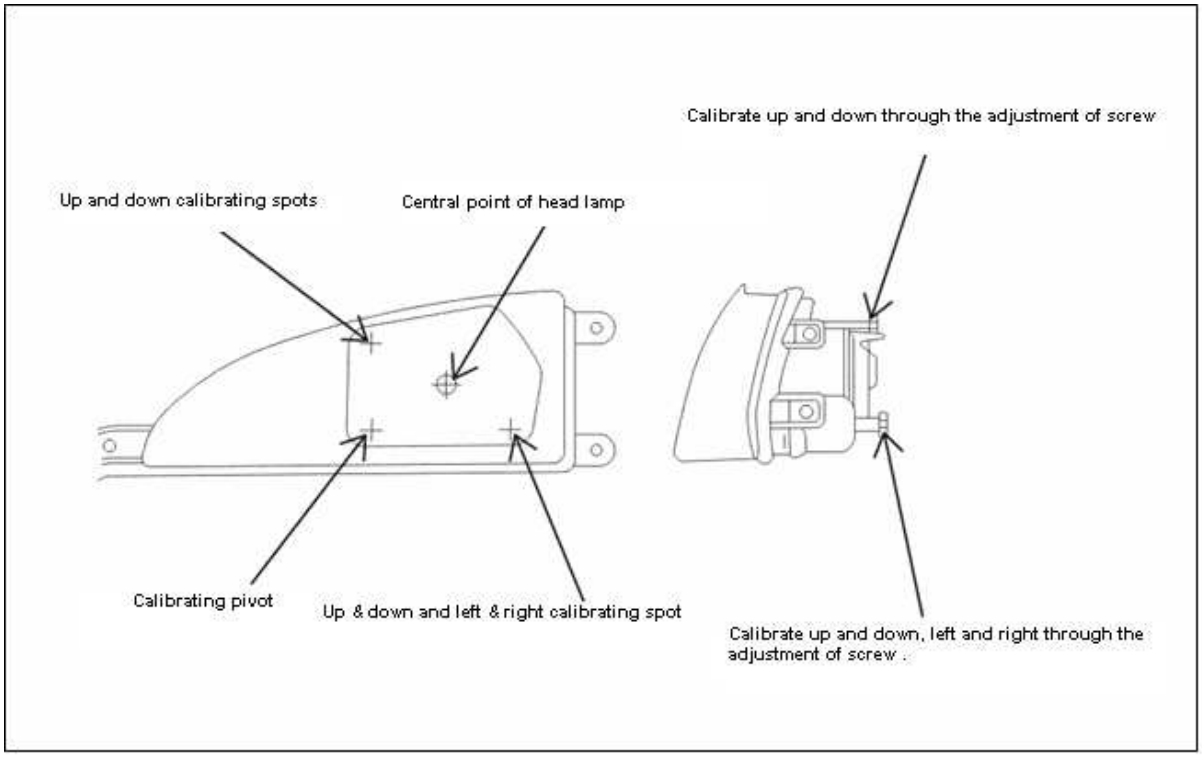
Park the vehicle on irregular ground. In face of the

screen or wall which is 3m away from headlight, charge tyre to the stipulated pressure, and discharge the load on vehicle (except driver). Draw horizontal line and vertical line on screen, screw plusminus screw, make the distance between high-strength center and horizontal line be 22mm, and then change to dipped headlight, at this time, the beam of dipped headlight should meet the anti-dazzle requirement of headlight.



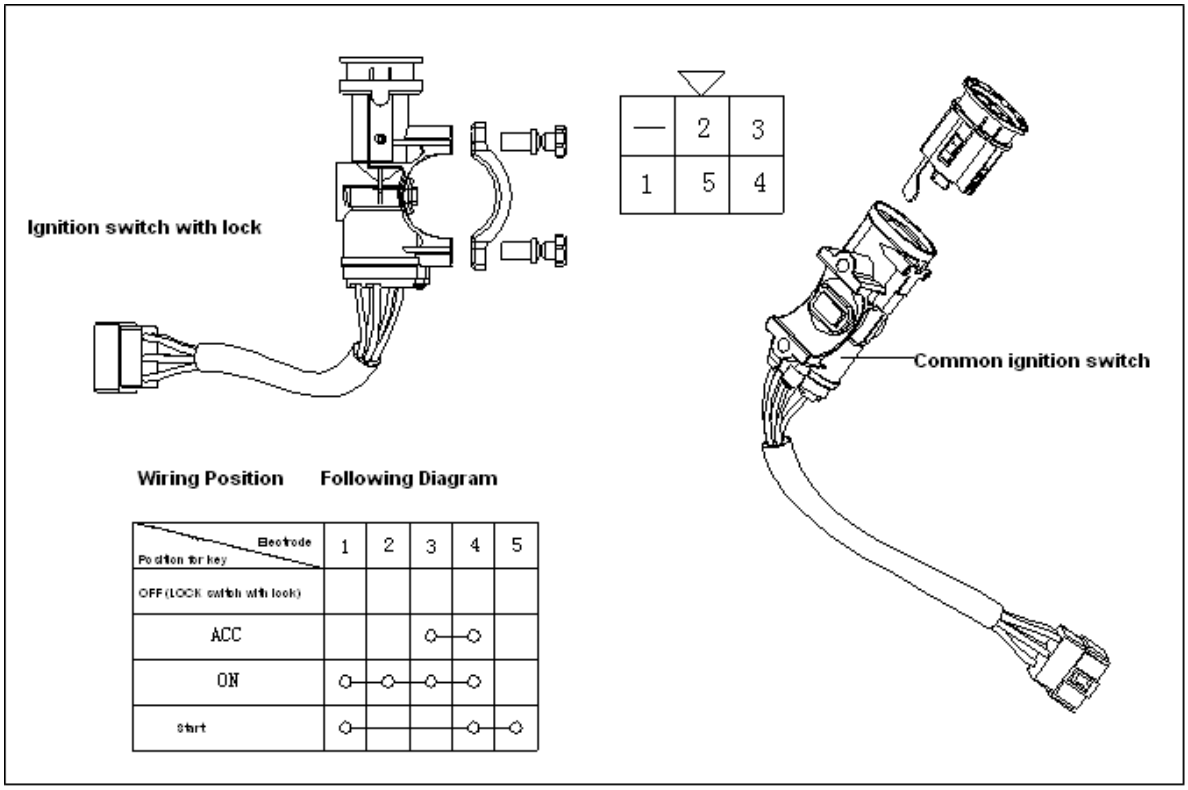
Description on Adjusting the Finished Axle of Headlight

- Adjust the calibration of headlight through the adjustment of screw.
- On the screen which is 3m in front of lamp, adjust the luminescence centre on the screen which is 3m in front of lamp with adjustment instrument, and adjust the luminescence centre with the adjustment instrument.

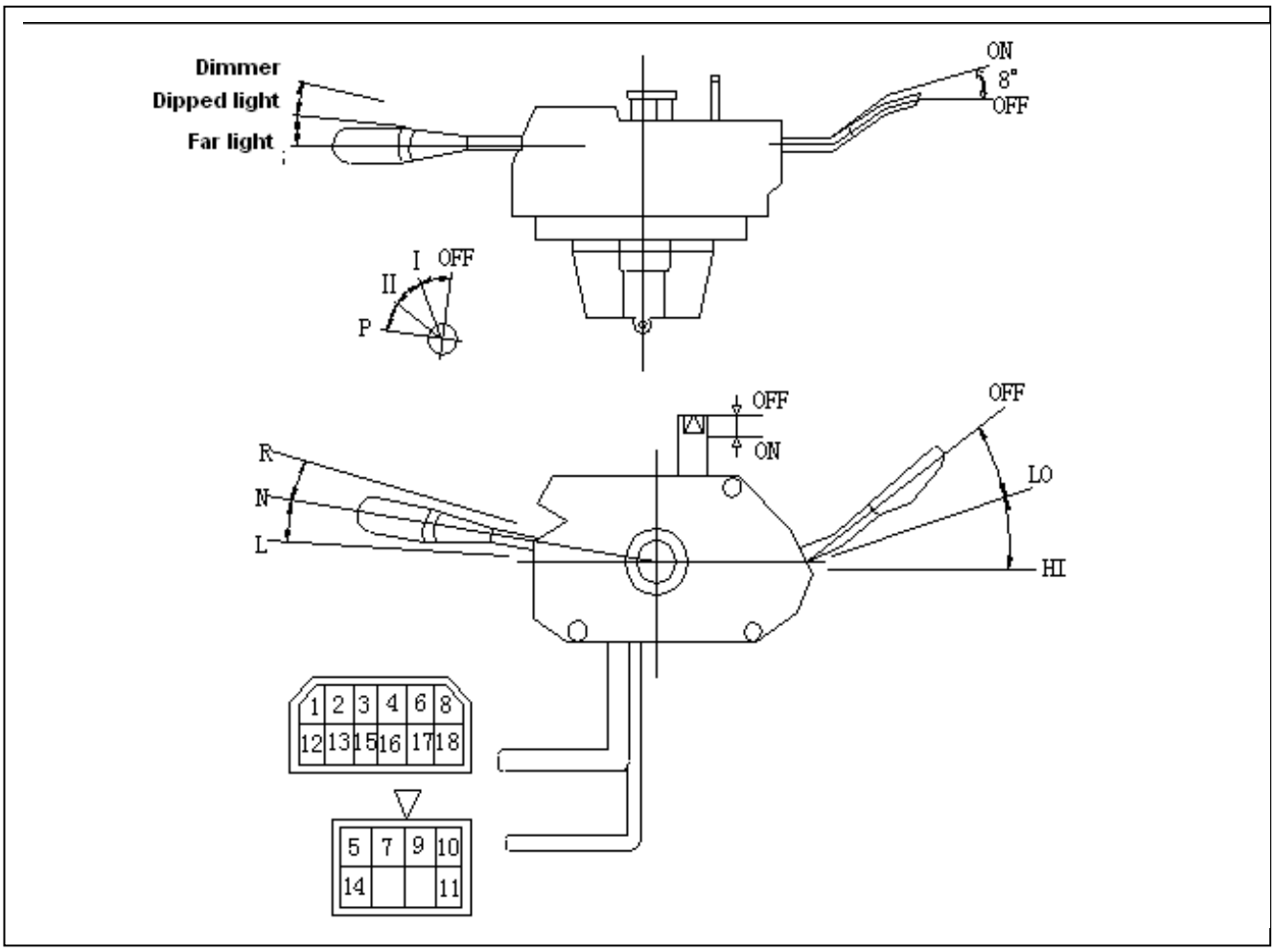

Calibrate up and down through the adjustment of screw
Up and down calibrating spots
Central point of head lamp
Calibrating pivot
Up & down and left & right calibrating spot
Calibrate up and down, left and right through the adjustment of screw .

10.9.4 Ignition Switch

Wiring Position



10.9.5 Combination Switch



◆Connection Position of Various Switch Motion Shown as the Following Tables

Turn Signal, Danger, Warning Light Switch

Motion and connection position of turn signal and danger signal switch

Handle position \ Terminal No.		13	4	15	12	14	5
Switch of turn lamp	R	○	○				
	N						
	L		○	○			
Switch of warning lamp	OFF				○	○	
	ON	○	○	○	○		○

Lamp, Dimmer Switch

Motion and connection position of lamp and dimmer switch

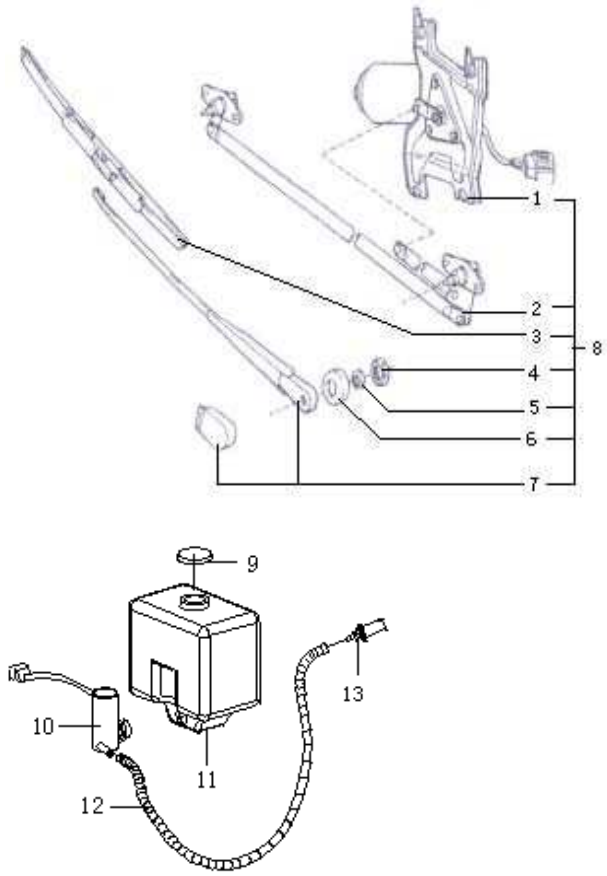
Handle position \ Terminal No.	1	2	3	9	10	11	Terminal No. / Dimmer handle position
OFF				○		○	Overtaking lamp
							Dipped light
							Far light
	○	○	○	○		○	Overtaking lamp
							Dipped light
							Far light
	○	○	○	○		○	Overtaking lamp
				○	○		Dipped light
				○		○	Far light
	○	○		○		○	Overtaking lamp
							Dipped light
							Far light

Wiper and Syringe Switch

Motion and connection position of wiper and syringe switch

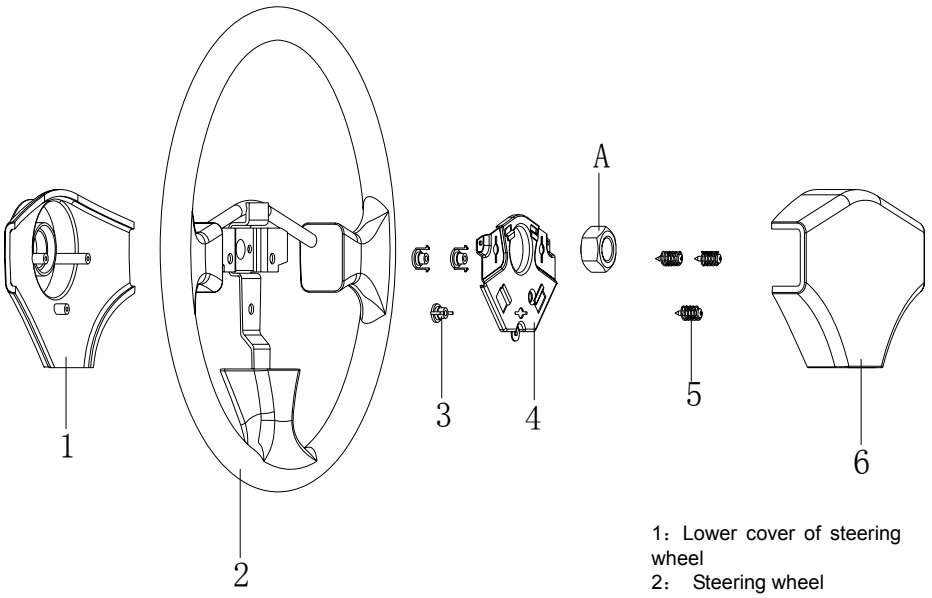
Handle position \ Terminal No.		7	17	8	6	18	19
Switch of wiper	OFF		○		○		
	INT	○	○		○		○
	LO	○	○				
	HI	○		○			
Switch of syringe	OFF						
	ON	○				○	

10.9.6 Windshield Wiper and Syringe



1: Wiper motor and bracket assembly
2: Wiper connecting rod assembly
3: Wiper assembly
4: Nut M18×1.5
5: Gasket with pad
6: Tarpaulin
7: Wiper arm assembly
8: Wiper assembly
9: Kettle cover
10: Syringe motor
11: Syringe kettle
12: Syringe shower pipe
13: Syringe nozzle discreteness

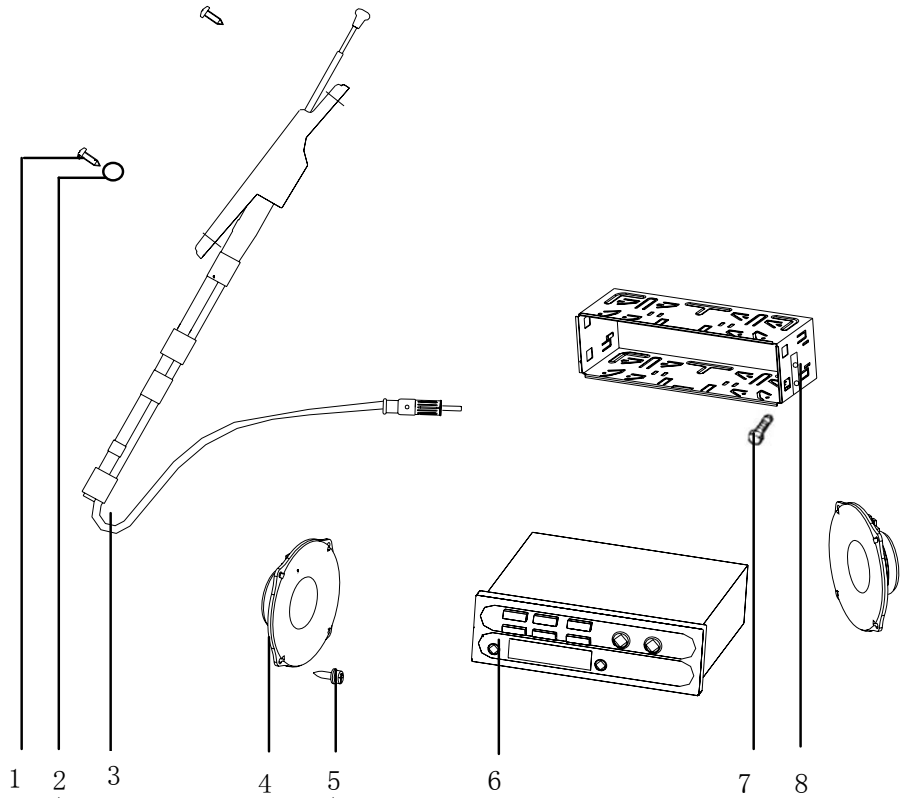
10.9.7 Steering Wheel and Horn



Tightening Torque	N • M
A	35-45

1：Lower cover of steering wheel
2： Steering wheel
3： Springcup
4： Touch board
5： Spring of touch board
6： Upper cover of steering wheel
7： Horn

10.9.8 Radio & Cassette Player



1. Bolt M4×14
2. Gasket 4-140HV
3. Antenna assembly of radio & cassette player
4. Loudhailer assembly
5. Tapping screw ST4.8×13-C-H
6. Assembly of radio & cassette player
7. Installation frame of radio & cassette player
8. Tapping screw ST4.8×16

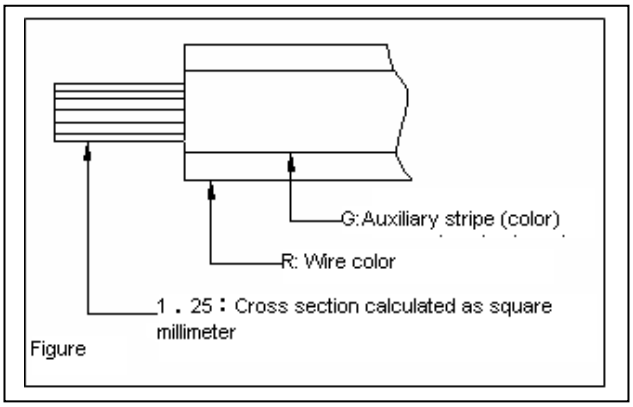
10.10 Circuit Diagram

◆ Specifications

·Circuit Specifications and Color Description

When one circuit uses two colors, the marking for wire is shown as follows:

Example: 1.25-RG



Figure

Color Code for Wire

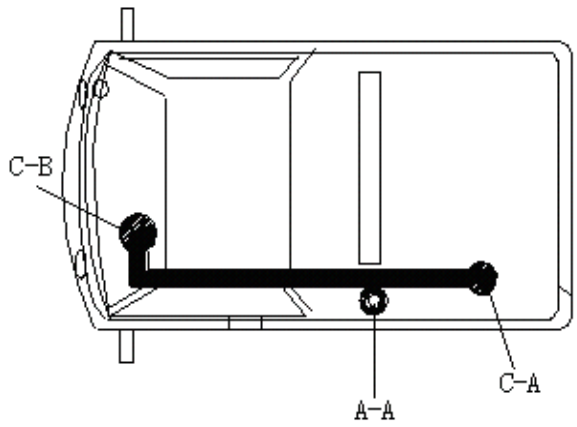
Wire Color	Code
Black	B
White	W
Red	R
Yellow	Y
Green	G
Brown	N
Blue	L or Bl
Grey	Gr or S
Orange	O

Note: When not giving clear indication of section, its section is 0.5 mm^2.

· Abbreviation Symbol Description of Circuit Diagram

Abbreviation Symbol	Express Content	Abbreviation Symbol	Express Content
ACC	Accessories	ILL	Lightening
AM	Power Supply for Ignition Switch	ST	starter
BEAM	Far Light Indicator	T/L	Turn Signal Indicator (Left)
BRK	Brake Warning Indicator	T/R	Turn Signal Indicator (Right)
CHG	Charging Indicator Light		
IG	Ignition Device		

· Earth Wire Arrangement Diagram and Illustration

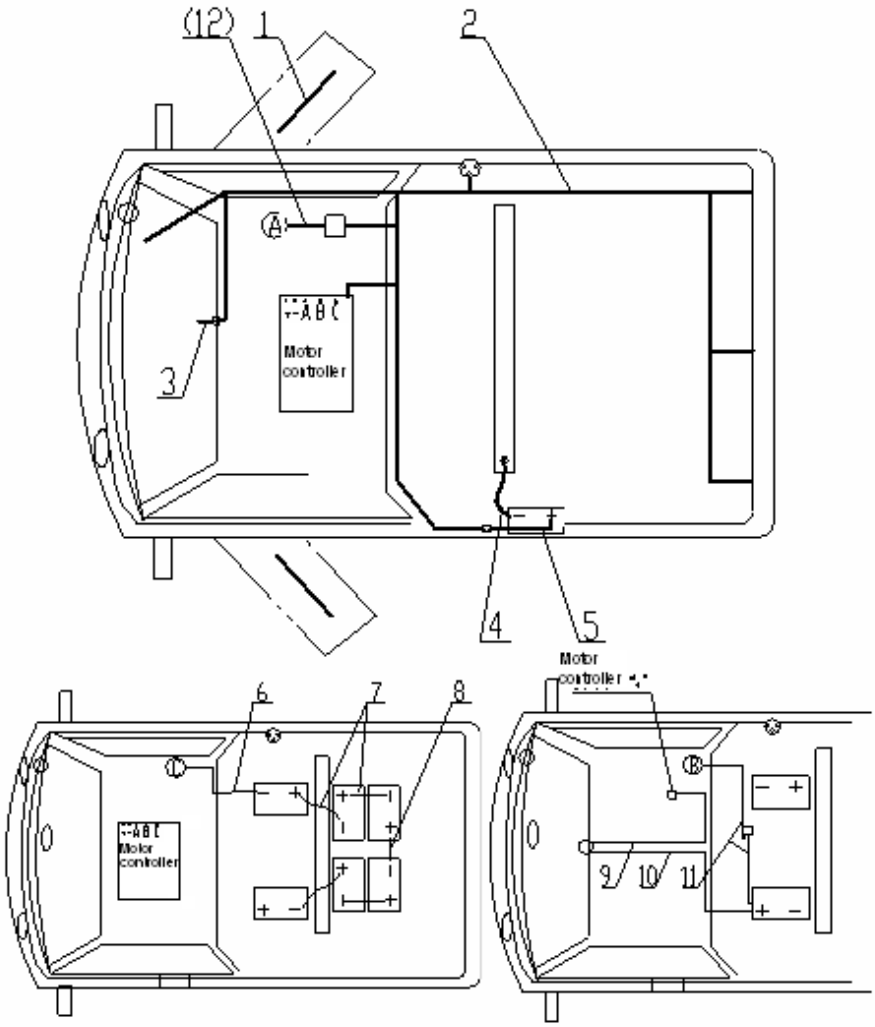


"A-A"： Earthing of battery

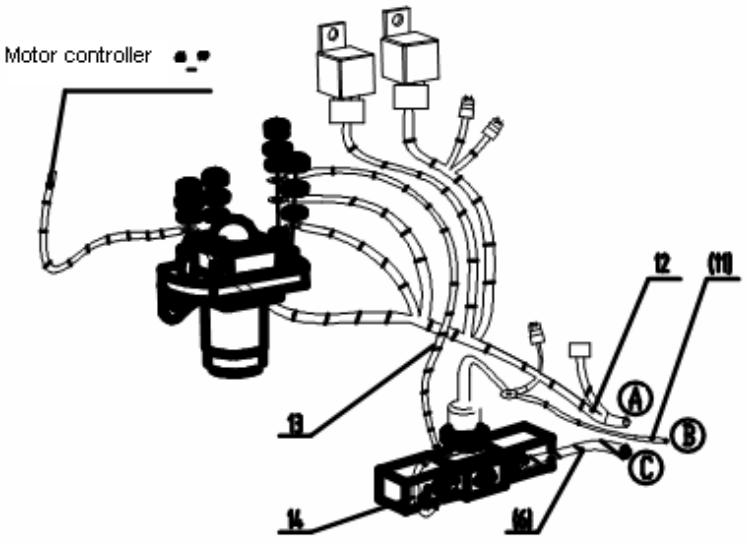
"C-A"： Earthing of tail wiring harness

"C-B"： Earthing of main

· **Connection Beam Arrangement Diagram and Illustration**

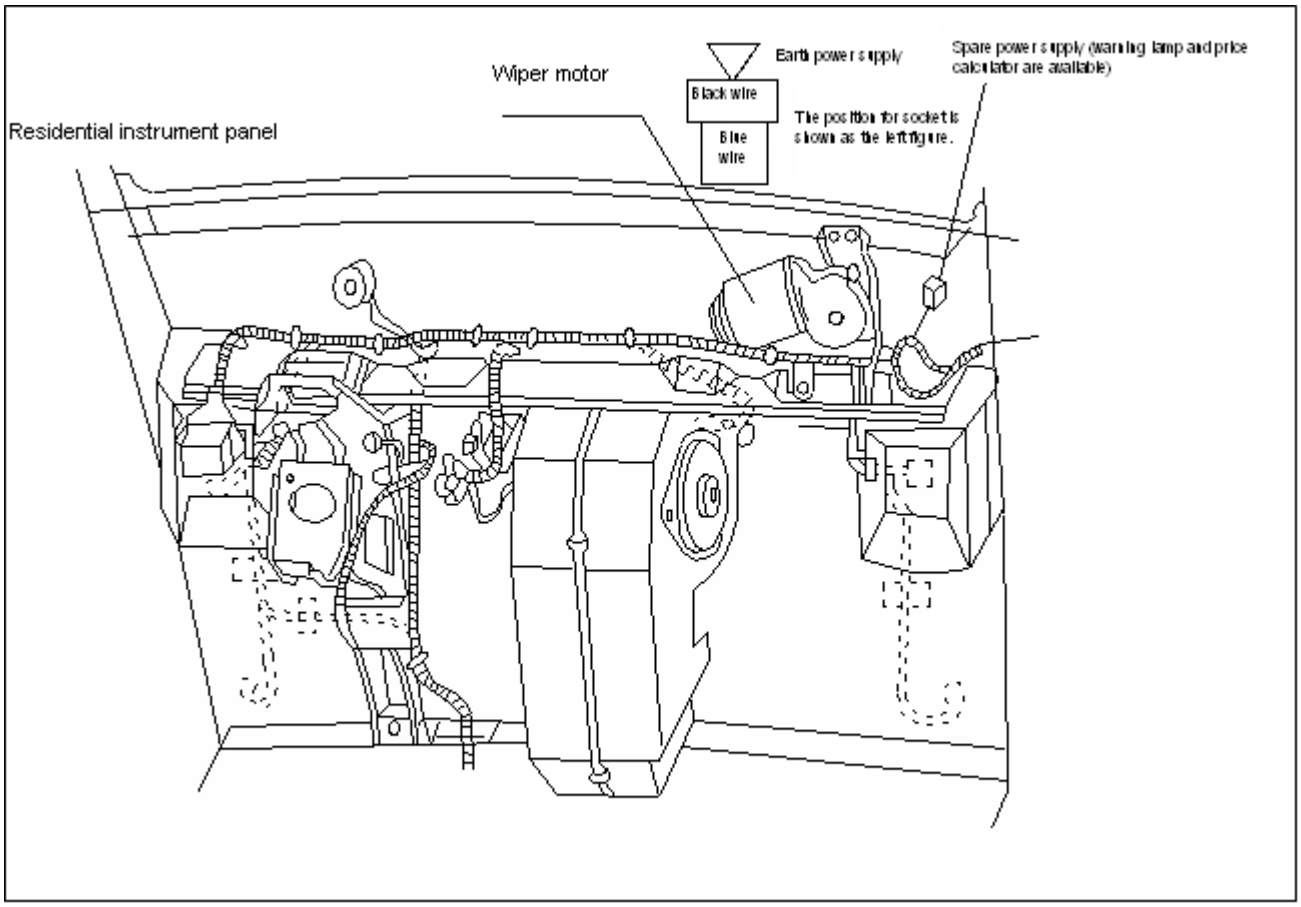


1. Assembly of front door wiring harness
2. Assembly of main wiring harness
3.Assembly of ceiling lamp wiring harness
4.Assembly of earth wire
5.Assembly of power positive wire
6. Power wire negative wire
7. Long wire specialized for Hoppecke battery
8. Power battery connection wire
9. Assembly of charging wiring harness
10. Connection wire of emergency power off switch
11.Connection wire of power battery charging
12. Assembly of negative controller wiring harness
13.Assembly of contactor and fuse connection wire
14. Assembly of fuse and LED connection wire



10.10.1 Structural Arrangement Diagram for Complete Vehicle Wiring

Instrument Panel Wiring Harness


Wiper motor
Earth power supply
Spare power supply (warning lamp and price calculator are available)
Black wire
Blue wire
The position for socket is shown as the left figure.
Residential instrument panel

10.10.2 Schematic Diagram for Complete Vehicle Electrical Arrangement

Schematic diagram for complete vehicle electrical arrangement, mark the drawing according to different vehicles, attached to the book, lookup the above diagrams to exclude specific electric failure according to the mode of failure occurred.